Substance Abuse and Mental Health Services Administration
Center for Substance Abuse Prevention
Division of Knowledge Development and Evaluation

Science-based Practices in Substance Abuse Prevention: A Guide

Working Draft

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Contents

Figures and Tables

Chapter 1
Framework

Introduction

As the lead Federal Agency for substance abuse prevention, the Center for Substance Abuse Prevention (CSAP) has a major role in bridging the gap between prevention research and practice by identifying effective program and practices, and disseminating that knowledge to the field. Identifying knowledge, however, presents a challenge, in part, because different individuals and organizations bring different methodological criteria, standards, and expectations— ranging in rigor from requiring experimental studies to allowing systematic observation to accepting clinical judgments. Nonetheless, it is important that CSAP develop an integrated framework so knowledge can be defined, assessed, and disseminated.

Toward this goal, this guide has five major objectives:

1. Identify a conceptual model that provides a unifying and predictive framework for substance abuse prevention;

2. Discuss the principles that provide a foundation for understanding and for defining research findings as "scientifically defensible";

3. Identify and apply specific principles and criteria to research studies, program evaluations, and scholarly efforts that enable CSAP to identify scientifically defensible findings, prevention principles, and prevention models;

4. Present scientifically defensible findings; and

5. Discuss how these findings can be used to ensure that the prevention strategies selected for implementation adhere to the guidance provided here.

Conceptual Framework - Risk and Protective Factors

Theory and theoretical frameworks in the substance use prevention field have been evolving over time, often through induction based on applied empirical research. Among the most important developments in substance abuse prevention theory and programming in recent years has been a focus on risk/protective factors as a unifying descriptive and predictive framework. Put simply, one often tested and supported hypothesis deriving

from this framework is that the more *risk factors* a child or youth experiences, the more likely s/he will experience substance abuse and related problems in adolescence or young adulthood. Researchers have also found that the more the risks in a child's life can be reduced, the less vulnerability that child will have to subsequent health and social problems (Hawkins, Catalano, & Miller, 1992).

However, research has also demonstrated that exposure to even a significant number of risk factors in a child's life does not necessarily mean that substance use or other problem behaviors will follow inevitably. Many children and youth growing up in presumably high-risk families and environments emerge relatively free of problems. The reason for this, according to many researchers, is the presence of *protective factors* in these young people's lives. Protective factors balance and buffer risk factors (Hawkins et al., 1992). Taken together, these data enhance our understanding of how and why youth initiate substance use as well as provide some direction for preventing, decreasing, or eliminating use.

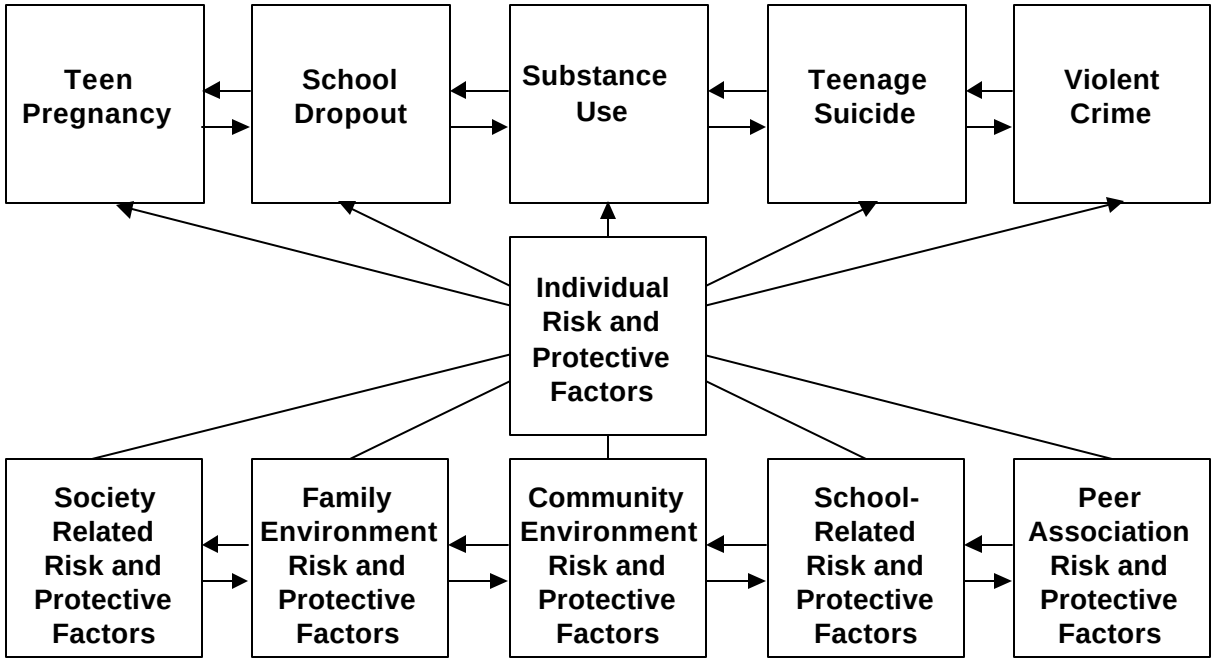
Risk and protective factors exist at every level at which an individual interacts with others and the society around him or her. The individual brings a set of qualities or characteristics to each interaction, and these factors act as a filter, coloring the nature and tone of these interactions–positive or negative. One way to organize these factors is by life domain. Specifically, six life domains in which interactions occur have been identified, as listed below. Within each domain, subdomains of risk and protective factors have been identified through decades of research; these are listed in the parentheses below. (See Chapter 2, Data Matrix, for a specific listing of risk and protective factors).

- **#** Individual (biological and psychological dispositions, attitudes, values, knowledge, skills, problem behaviors)
- **#** Peer (norms, activities)
- **#** Family (function, management, bonding)
- **#** School (bonding, climate, policy, performance)
- **#** Community (bonding, norms, resources, awareness/mobilization)
- **#** Society/environmental (norms, policy/sanctions).

As noted above, these life domains cannot be viewed as static; they all affect the individual and are affected by the individual's perceptions and interactions with others. This more intricate set of relationships is depicted by the Web of Influence Model (Figure 1), which posits a complex interaction between the individual within five external domains resulting in substance use and other problem behavior.

Just as the Web of Influence Model can be used to systematize risk and protective factors, so can the Institute of Medicine (IOM) program classification system be used as a way of organizing intervention programs and matching them to the needs of the targeted populations (Kumpfer, 1997). According to this classification system, prevention and intervention programs can represent universal, selective, and indicated efforts. *Universal programs* target general population groups without identifying those at particularly high risk. All members of the community benefit from prevention efforts rather than specific individuals or groups within a community. *Selective programs* target those who are at

Figure 1: Web of Influence



greater-than-average risk for substance abuse. The targeted individuals are identified on the basis of the nature and number of risk factors for substance abuse to which they may be exposed. *Indicated programs* are aimed at individuals who may already display signs of substance use/abuse. These efforts provide intensive programming for individuals in order to prevent the onset of regular or heavy substance use. Taken together, the Web of Influence and the IOM's program system provide a conceptual and organizational scheme for targeting outcomes and risk groups.

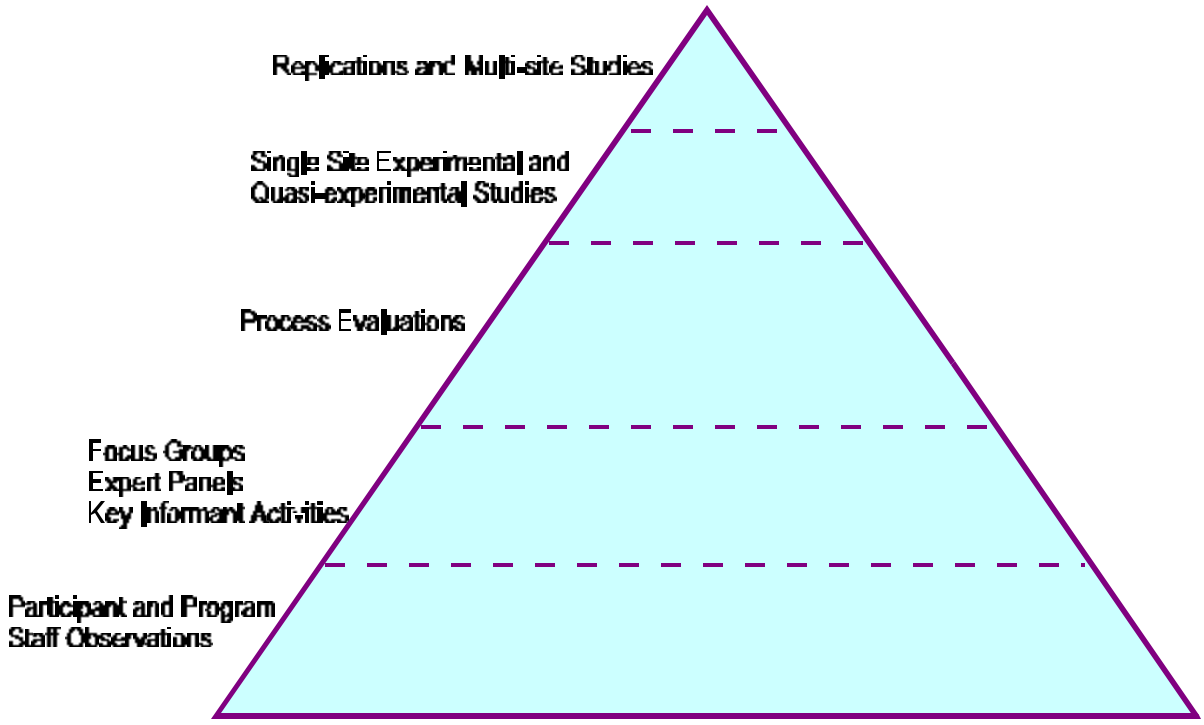
Principles for Defining Scientifically Defensible Knowledge

Scientific inquiry stems from our need to understand the world in which we live. The strength of science and the scientific method is that they use strictly defined, standardized procedures to determine how events are causally related. As science improves its methods, we benefit with increasing levels of certainty about the nature and extent of cause-and-effect relationships–we understand better what is required in terms of resources and effort to achieve specific outcomes. As we attempt to use the scientific method more systematically to gain knowledge, we also recognize the diversity of ways in which prevention programs are conducted and data extracted.

Data Types/Research Strategies. Much discussion of knowledge focuses on the results of quantitative outcome evaluations. However certain kinds of qualitative information are not amenable to strict quantitative evaluation. Qualitative data may describe program process or identify contextual mediating variables that affect outcome results. Such process information embellishes findings from programs, providing a richer understanding of the program results. By ignoring these qualitative data, researchers and the field in general lose valuable information. Reviews of qualitative information can produce credible findings and recommendations. For example, expert consensus panels convened by many Government Agencies (e.g., CSAT, NIH, FDA, NIAAA) and private organizations work to review data, reach conclusions, and formulate recommendations affecting the health and well-being of the Nation as a whole. Similarly, CSAP has convened Prevention Enhancement Protocol Systems (PEPS), which use expert consensus panels to identify what we know about several substance use prevention topics, including tobacco prevention/cessation and family prevention issues. Figure 2 identifies numerous data collection techniques used to gain knowledge in the substance abuse field. The techniques are mapped onto a pyramid so as to reflect what proportionate of information is generated by a particular technique. Paradoxically, as indicated in the figure, the more sophisticated and traditionally accepted scientific approaches represent a small portion of data collection efforts, yet the information derived from such studies constitutes a significant portion of the formal knowledge base. Still, it is important that CSAP value the diverse approaches to learning, because they all can be based on sound scientific principles and all can add to the knowledge about constructing and implementing successful prevention interventions.

Although the purpose of science is to increase the level of certainty regarding cause-and-effect relationships, and although theoretical direction/derivation makes it possible to test and extend theory, not all research in the substance abuse prevention field, or any other

Figure 2
Data Collection Pyramid



field, is equally suited to the task. Research may be conceived as varying in quality along three dimensions: *credibility, generalizability, and utility.*

Credibility. Credibility refers to the level of certainty concerning the study findings and requires, at a minimum, temporal sequencing of cause and effect (i.e., the cause always precedes the effect) as well as the ability to discount other potentially spurious causal agents. Spurious agents may be internal to the research (e.g., unreliable measurement) or external to the research (e.g., contamination of the control group by contact with the intervention group).

Utility. Utility refers to the extent to which the information can guide other programming development or maintenance decisions, help better define and delineate results, or guide future research.

Generalizability. Generalizability refers to the extent to which findings from one study implemented in one site with a specific target population can be applied to other settings and populations.

Applications of Dimensions to Research Studies and Program Evaluations

Although utility and generalizability of a research study or program evaluation are critical in developing strategies for knowledge dissemination, the primary dimension that CSAP uses to assess the knowledge base concerning intervention effectiveness is that of scientific credibility. We are confident that applying this dimension to CSAP-funded projects, as well as others, will move us expeditiously toward a unified knowledge base.

Research studies and the findings they produce vary along the dimension of credibility. The level of observed credibility of research findings on the causes of intervention program effects hinges on whether the methods employed provide at least a reasonable means of assessing change over time attributable only to the program. This simple, summative criterion has a number of component parts that can be applied to assess the credibility of research. An example of this type of exercise is CSAP's development of the High Risk Populations (HRP) Databank, which involves reviews of CSAP HRP Demonstration Grants. Nine criteria were used by expert evaluators to assess the rigor of grantee program evaluations: six criteria were used to rate various aspects of methodological rigor, one was used to rate fidelity (#2), one for utility (#9), and one for overall integrity/credibility (#8). The nine criteria are listed below:

1. Theory – the degree to which the project findings are based in clear and well-articulated theory, clearly stated hypotheses, and clear operational relevance.

2. Fidelity of interventions – the degree to which there is clear evidence of high-fidelity implementation and to which the dosage of the program was sufficient to effect positive change.

3. Sampling strategy and implementation – the quality of sampling design and implementation, and the strength of evidence concerning sample quality (e.g., data on attrition).

4. Measures – the operational relevance and psychometric quality of measures used in the evaluation, and the quality of supporting evidence.

5. Data collection – the quality of implementation of data collection (e.g., amount of missing data).

6. Analysis – the appropriateness and technical adequacy of techniques of analysis, primarily statistical.

7. Plausible threats to validity – the degree to which the evaluation design and implementation address and eliminate plausible alternative hypotheses concerning program effects. The degree to which the study design and implementation warrant strong causal attributions concerning program effects.

8. Integrity – the overall level of confidence that the reviewer can place in project findings based on research design and implementation.

9. Utility – the overall usefulness of project findings for informing prevention theory and practice. This rating combines the strength of findings and the strength of evaluation: were the findings consistent, both internally and in relation to expectations or predictions from theory? Many studies describe a single positive finding as proof of the effectiveness of their intervention. However, in most cases, corroborative data are absent, and often contradictory data (e.g., drug substitution) are in evidence.

Each of the criteria above were rated by pairs of trained evaluators on a 5-point scale. Of particular importance was the rating of integrity, on which reviewers were required to reach consensus. This rating reflects how much confidence reviewers have in the findings. Confidence is derived from the quality of the intervention implementation as well as the design of the evaluation study and how well the evaluation was actually put into effect. For example, a reviewer may have little confidence in an experimental study in which there was high and differential attrition. The integrity rating received by such a study might be a 2–little confidence - or if attrition was egregiously pronounced, the study's integrity rating may have dropped to 1–no confidence. Alternatively, when few problems were encountered, attrition was modest, intervention implementation was solid, analysis was acceptable, and so on; the integrity rating received would have been a 4–confident. When problems in intervention implementation and research design and implementation were minimal, integrity ratings reflecting stro confidence in findings (i.e., 5) were assigned. An integrity rating of 3 reflected some confidence in resultant data. This rating was often used when program characteristics were strong enough to inspire some confidence, yet because of imperfect implementation of the program, moderate attrition rates, data analyses that were not comprehensive, uncorrected differences between treatment and

Table 1
Sample Application of Scientific Credibility to an Intervention Program

Summary Matrix for Grant ZZZ

	Ratings					
Criteria	**NA**	**1**	**2**	**3**	**4**	**5**
1. Theory				X		
2. Fidelity of Interventions				X		
3. Sampling Strategy and Implementation					X	
4. Measures					X	
5. Data Collection					X	
6. Analysis					X	
7. Plausible Threats to Validity				X		

Ratings for 1 - 7 are from Very Low (1) to Very High Quality (5)

Overall Program Ratings:

8. Integrity				X		
9. Utility				X		

Ratings for Integrity:
1 = no confidence
2 = weak, at best some confidence in results
3 = mixed, some weak, some strong characteristics
4 = strong, fairly good confidence in results
5 = high confidence in results, findings fully defensible

Ratings for Utility:
1 = clear findings of null or negative effects based on sound theory and program design
2 = findings were predominantly null or negative, though not uniform or definitive
3 = findings were ambiguous because of inconsistency in result or methods weaknesses
4 = findings were positive and support efficacy of some components of the program
5 = clear findings of positive effects supporting the efficacy of the program based on

comparison samples, or secular events that contaminated samples, were not sufficient to assure reviewers that the results were wholly attributable to the program intervention.

Figure 3 depicts such a review. In the figure, program ZZZ has an overall integrity rating of 3. This program was rated well on many of the criteria; however, evaluators did not demonstrate that the program's control and treatment groups were comparable prior to the intervention. Furthermore, the statistical analyses testing differences between the groups after the intervention did not attempt to control for what might have been meaningful pretest differences. In addition, the age group differences observed on outcome measures were large and not predicted by theory. However, this program, along with a number of other programs, shows differences in youth's knowledge of the harmful effects of substance use as a result of participating in classroom-based drug education, a result that, given the measurement protocols, could not be attributed to any event or occurrence other than the program intervention. Therefore, despite mixed confidence, this program can be considered promising and can provide corroborative evidence that this prevention strategy can be effective in altering youth knowledge of the harmful effects of substance use.

The above criteria are currently applied to High Risk Youth (HRY) programs and programs for Pregnant and Postpartum Women and their Infants (PPWI). They also can be applied to other research studies and evaluations to examine the quality of endeavors. For example, these nine criteria, slightly adapted to maximize use of program-specific objectives, are being applied to CSAP's Community Partnership programs in an ongoing effort to extract program data for use in the DataBank.

It is important to note that well-designed studies can be poorly implemented, well-implemented programs can be poorly evaluated, and findings may be overstated. Overstated findings do not contribute positively to our knowledge base. (Instead, authors should report the negative findings from well-implemented, rigorously evaluated interventions because knowledge of what does not seem to work is also of real value.)

The CSAP DataBank review uses a qualitative meta-analytic technique, one of two types of meta-analytic techniques currently favored as means of organizing information and extracting defensible principles. Both this qualitative technique and other quantitative techniques derive directly from the oldest, most basic meta-analytic technique–the literature review. In a literature review, researchers scrutinize and critique original papers, determine among themselves the merit of specific items, and then integrate the findings in discussions with each other or alone. Sometimes, this thinking results in the proposition of a "critical experiment" that, if performed, would shed light on the true phenomenon under scrutiny. More often, the result is a simple summary of the field, with the authors' conclusions supported by the amount and consistency of the data they were able to

assemble. Literature reviews contribute to the current thinking in many areas concerning the state of the art in the field and provide clear guidance regarding gaps in the knowledge base that need to be filled.

The current DataBank review differs from a basic literature review in several important ways. The DataBank review uses source documents in the form of project Final Reports, not just articles published in journals. This avoids the biases inherent in using only journal articles, and also because the DataBank is charged with incorporating both qualitative and quantitative information, provides for outcome and process data that will inform researchers, policy makers, and program planners. In addition, this review employs a process in which trained, expert reviewers use standard instruments to evaluate individual programs, coming to consensus regarding the credibility of the specific programs reviewed. Systematizing the procedures and categorizing the outcomes across programs through this type of qualitative meta-analytic technique is a clear improvement over traditional literature review efforts.

Like qualitative meta-analytic techniques, quantitative procedures use rules for inclusion of information. In general, these rules mirror the nine criteria described above in reference to the HRP DataBank. No matter who does the review, research protocols are screened for quality of design and implementation. What may differ is the set of procedures and rigor of the review itself. Quantitative meta-analytic techniques differ from the more qualitative procedures in that program characteristics as well as outcomes are quantified. Outcome measures are standardized as “effect sizes” and aggregated/analyzed across studies. These methods are quite powerful, but, like any other procedure, are not without potential hazards (e.g., relying solely on journal publications, averaging equally over differentially important measures). Recent quantitative meta-analytic efforts including Tobler’s (1992) analysis of the effectiveness of substance use school-based prevention programs and the National Center for the Advancement of Prevention meta-analyses of the Correlates of Marijuana Use and the Correlates of Alcohol and Tobacco Use advanced the knowledge base considerably.

Because quantitative meta-analytic techniques focus on specific effects, they are extremely useful in identifying consistently moderate or large outcomes, and then in relating these observations to specific program characteristics. Quantitative techniques are useful in deriving prevention principles–identifying specific prevention practices that are most closely related to consistently favorable outcomes. The more qualitative meta-analytic techniques, on the other hand, are based on program, not outcome. As a result, qualitative techniques can be used to identify both successful program models and prevention principles. Both types of techniques can be supported by field observation and/or careful

review of complete program documentation (e.g., process analyses) to assist in developing and/or deriving principles regarding successful program implementation.

Current Summary

The current summary of prevention programs and principles presented below include data taken from both qualitative and quantitative meta-analyses, as well as from critical overviews of published research.

Qualitative Meta-Analyses

Critical Literature Reviews. As noted above, critical literature reviews have an important role in synthesizing and integrating knowledge. Critical reviews provide statements of the state of the art in a specified field and serve a heuristic purpose as well, guiding further efforts to better understand still unanswered questions. This guide incorporates the results of several well-implemented critical reviews including the following CSAP-sponsored NCAP efforts:

- Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems
- The Role of Education in Substance Abuse Prevention (Implementation Guide)
- The Role of Information Dissemination and Mass Media in Youth-Oriented Prevention (implementation Guide)
- The Role of Problem Identification and Referral in Youth-Oriented Prevention (Implementation Guide)
- A Review of Alternative Activities and Alternative Programs in Youth Oriented Prevention (CSAP Technical Report 13, 1996).

Qualitative Meta-Analytic Techniques Using Specific Rating Criteria. In addition to information derived from critical literature reviews, information derived from expert consensus procedures is incorporated in this guide. Generally, as part of the consensus process, implementation was assessed for fidelity, and research was reviewed for rigor. Outcomes, and our confidence in those outcomes, were rated using standard, relatively objective methods. The consensus efforts incorporated in this guide include the following:

- The National Structured Evaluation (NSE) was one of the first of the expert consensus reviews undertaken. The NSE reviewed and rated, using standard procedures and measures, the level of methodological rigor of substance use prevention programs carried out through 1991. The NSE effort included federally funded programs as well as programs sponsored by universities, foundations, and State or local governments. When the analysis was complete, only 10% of the studies reviewed met or exceeded the criteria set for moderately rigorous studies (i.e., a rating of 3).

- Jansen (1997) continued work in this vein, evaluating and selecting a number of substance abuse prevention program evaluations and field studies that reflected effective programming. Data from individual projects were used to derive more general principles concerning program effectiveness.

- The National Institute on Drug Abuse (NIDA, 1997) produced a review document citing NIDA-sponsored substance abuse prevention programs viewed as effective. The document makes general recommendations concerning key elements of effective intervention programming.

- Sherman and colleagues (1997) conducted a review of Department of Justice programs using a methodology similar to that used in the NSE. Programs were reviewed and rated for methodological rigor. Principles concerning effectiveness of overall strategies were derived and presented as key findings. In addition, the authors evaluated grant/funding mechanisms for adequacy.

- Over the past few years, CSAP has sponsored the PEPS, a knowledge development effort employing a panel of experts to review the literature in a specific area to identify credible evidence. A strict evidentiary procedure is employed to evaluate and then include or exclude individual research findings. Within specified question areas, findings are then assessed for consistency of valence and magnitude in order to arrive at a defensible conclusion.

- CSAP Community Partnership Programs have yielded considerable information. Results from the recent cross-site evaluation have increased knowledge about community wide prevention efforts.

- The CSAP HRY demonstration grants program was reviewed and reevaluated to identify credible evidence of program effectiveness. An expert consensus process was used, evaluating each final report filed through December 1995 on the criteria defining program credibility. In addition, utility of study information was rated for

each program, and the consistency of results was weighed in determining the evaluation of program effectiveness. (These criteria were presented previously in this guide.) Like the NSE, roughly 10% of program evaluations met the criteria set for being at least moderately rigorous. Roughly 2% of studies reviewed met the more stringent standards used in this evaluation to identify well-implemented, solidly evaluated, effective model programs.

Quantitative Meta-Analyses

The most stringent coding and rating protocols can be followed when there are a wealth of studies with concordant data. As the discipline of substance abuse prevention continues to evolve, quantitative efforts like these will become more commonplace. Included in this guide are data from the following quantitative meta-analyses:

Tobler's meta-analyses of school-based prevention programs (Tobler, 1986, 1992).

Through NCAP, CSAP has undertaken a series of large scale meta-analyses, each focusing on a specific topic area relevant to substance use and substance use prevention (e.g., Correlates of Marijuana Use Among Youth). In general, large numbers of published research studies are screened, codified and analyzed. In its meta-analysis of the correlates of marijuana use, NCAP identified 900 longitudinal studies, from which 197 published reports were deemed relevant. Of these, 84 prospective studies were selected for analysis. Information from two other similarly rigorous NCAP efforts still in progress are used in this guide, in whole or in part, in developing prevention principles:

Correlates of Alcohol and Tobacco Use Among Youth

Meta-Analysis of the Effectiveness of School-Based Programs

This guide accepts data from these qualitative and quantitative sources as credible, relying on the review processes implemented and/or the expertise of the review panels convened to identify effective programs, principles or important research findings. With these data as building blocks, we generalize across the various agencies and time periods in which the data were collected to develop some *key principles* and *models* of effective substance abuse prevention.

The first step to integrating the information from these diverse data sets was to

extract and array study findings in a matrix within the framework of risk and protective factors and, more specifically, in conformance with the Web of Influence Model (Figure 1). Within each life domain, studies were arrayed according to the subdomain of risk and protective factors addressed and intervention strategies employed.

Chapter 2 presents the full Data Matrix, including risk/protective factors, intervention activity/strategy, principle/finding, and source citation. In addition, each intervention entry is coded to identify both its location on the IOM (1994) continuum of intervention (universal, indicated, selective) and the categories of intervention strategies used in accordance with CSAP's Guidance for State Incentive Grant recipients: (1) information dissemination, (2) prevention education, (3) alternative drug free activities, (4) problem identification and referral programs, (5) community-based processes, and (6) environmental approaches (CSAP, 1993).

The matrix includes programs chosen based on strenuous reviews (such as the CSAP model HRY programs) or highlighted by experts in the field as examples of particular intervention strategies. The matrix highlights programs supported by Government Agencies, including CSAP, NIDA, and the Department of Justice. These programs vary in levels of rigor. For example, eight CSAP programs incorporated in the matrix represent the highest level of rigor and credibility. Other CSAP programs representing moderate levels of credibility are incorporated because they demonstrate positive outcomes in relation to prevention strategies of interest or present corroborative evidence for model programs. Programs from other Government Agencies and the CSAP Community Partnerships are included in the matrix because federal agencies have chosen these programs through their own evaluative processes. The matrix should not be seen as an exhaustive effort, but rather as a work in progress. New sources of information must be integrated into the Data Matrix to make it truly comprehensive.

Chapter 3 describes the general principles derived from the data incorporated in the Data Matrix or presented in separate meta-analyses. The principles are organized first by the six life domains and then organized again by the six prevention strategies CSAP has identified for reporting purposes for States. The principles were derived by a preliminary matrix analysis, which began with identifying the prevention strategies linked to multiple types of outcomes. Then, the characteristics of the strategies linked to positive outcomes were identified. These simple analyses were then informed and extended by incorporating information from the PEPS (unpublished document), Community Partnerships (unpublished document), and NCAP efforts. A future objective is to convene a consensus panel of experts that will examine the contents of the Data Matrix and other relevant materials to derive a more comprehensive and detailed list of prevention principles. As the information in the Data Matrix increases, the derived principles will become more

exact, capable of providing better guidance in implementing effective substance abuse programs. Chapter 4 presents guidances for optimal use of the information contained in document for the purposes of:

- identifying scientifically defensible principles and program models;
- using the information included in the Data Matrix;
- reviewing grant proposals.

Chapter 2

The Data Matrix

The matrix below presents risk/protective factors, related interventions, and example programs/related research separately by the six domains.

Subscript numbers represent CSAP prevention strategies, as follows:

1 = Information dissemination
2 = Prevention education
3 = Alternatives

4 = Problem identification and referral
5 = Community-based process
6 = Environmental approach

CSAP Model Programs are indicated by an asterisk (*). The CSAP High-Risk Youth programs listed in the matrix received ratings of 3, 4, or 5. Programs rated as 4 and 5 were considered CSAP model programs and were chosen to be disseminated nationally .

Individual Domain

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
Alcohol, Tobacco, and Other Drug Knowledge and Attitudes:			
< Knowledge regarding risks associated with substance use/abuse is related to decreased risk of initiating or continuing use of substances	< Classroom/peer-led curricula including education	< Greater improvement in identifying unsafe objects related to tobacco, alcohol, and other drugs	< Early Childhood Substance Abuse Prevention Program (CSAP Grant #866) [1, 2] (2–5 years, Universal)
		< Increased perception of the harmfulness of substance use	< Southwest Texas State University's Program (CSAP Grant #1207)[1,2,3] (under 13 years, Selective)
		< Increased knowledge of the negative effects of substance use	< Woodrock Youth Dev't Program (CSAP Grant #3094) [1, 2] (9–13 years, Universal)
		< Increased perception of harm caused by substance use	< Storytelling for Empowerment (CSAP Grant #7821) [1, 2] (under 13 years, Universal)
		< Increased knowledge of alcohol, drugs, and sexual activity	< SMART leaders (CSAP Grant #903*) [1, 2] (13–17 years, Selective)

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
< Lack of information on positive health behaviors is associated with increases in substance use	< Classroom curricula designed to motivate pro-health decisions and skill use	< Decreased drug use problems, alcohol use, etc.	< Teenage Health Teaching Modules (Errecart, 1991) [1, 2, 5] (13–17 years, Universal) < Growing Healthy (National Center for Health Education, 1991) [1, 2, 3] (under 13 years) < I'm Special (Kim et al., 1990) [1, 2, 3,] (under 13 years)
		< Increased knowledge of negative effects of substance use	< Woodrock Youth Dev't Program (CSAP Grant #3094) [1, 2] (9–13 years, Universal)
< Lack of information on drug-related topics in curriculum is associated with increases in substance use	< Classroom curricula designed to specifically address alcohol, tobacco, and drug-related behavior (above curricula with multiyear booster sessions)	< Decreased use of alcohol, tobacco, and marijuana	< Life Skills Training Program (Botvin et al., 1995) [1, 2] (13–17 years, Universal) < Project ALERT (Ellickson et al., 1993) (13–17 years)

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
< Negative attitudes toward substances and substance use are associated with decreased likelihood of initiating or continuing use of substances	< After-school alcohol, tobacco, and other drug education/peer-led curricula	< Less likely to say they are willing to use drugs	< Comprehensive Youth and Family Excellence Project (CSAP Grant #249) [1, 2] (9 years, Selective)
		< Reduced levels of substance use	< Woodrock Youth Dev't Program (CSAP Grant #3094) [1, 2] (9–13 years, Universal)
		< Less favorable attitudes toward alcohol, marijuana, and tobacco	< SMART leaders (CSAP Grant #903*) [1, 2] (13–17 years, Selective)
		< Less perceived social benefits from using marijuana	< Family Advocacy Network (CSAP Grant #1383*) [1, 2] (13–17 years, Selective)
	< In-school alcohol, tobacco, and other drug education	< Lower willingness to use substances	< Project C.A.R.E. (CSAP Grant #1295) [2] (9 years, Selective)

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
Values:			
< Bonding to pro-social culture is related to lower delinquency and lower substance use	< Curricula incorporating cultural heritage lessons along with culturally appropriate activities	< Greater appreciation for African heritage and more positive Africentric values and racial identity	< NTU (CSAP Grant #1800) [1, 2] (under 13 years, Selective)
	< Culturally appropriate activities	< Significantly increased cultural pride	< Greater Alliance of Prevention Systems (CSAP Grant #1013*) [1, 3, 5, 6] (13–17 years, Selective)
< Positive relationships with adults are related to decreases in multiple problem behaviors including substance use	< Mentoring	< Increased positivity toward older people and improved attitude toward the future, school, and others	< Across Ages [1, 2, 3] (CSAP Grant #2779*) (under 13 years, Selective)
		< Less likely to initiate alcohol and drug use	< Big Brothers/Big Sisters (Tierney et al., 1995) [2, 3] (10–14 years, Selective)
Problem Behaviors:			
< Early sexual activity/teen pregnancy is associated with multiple problem behaviors including substance use	< Education peer support groups reinforcing unsupportive attitudes toward sexual permissiveness	< Increased knowledge about sex and less permissive views of early sexual activity	< SMART leaders (CSAP Grant #903*) [1, 2] (13–17 years, Selective)
< Violence/aggression is associated with multiple problem behaviors including substance use	< Classroom management with individual and group counseling/family therapy	< Reduced aggression	< Prime Time (Hughes & Cavell, 1995)

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
		< Decreased aggressive behavior for second-grade males (based on teacher ratings)	< Seattle Social Development Project (Hawkins et al., 1992) [1,2] (under 13 years, Universal)
< Early substance use is related to subsequent use and abuse	< Outpatient drug abuse treatment with aftercare support groups		< School-based Treatment Aftercare Support Groups (Kumpfer et al., 1991) (13–17 years, Indicated)
< Criminal/delinquent activity is associated with multiple problem behaviors including substance use	< Institutional placement, peer support groups, drug and social skills education, individual counseling	< Decreased use of alcohol, tobacco, and marijuana and decreased quantity and numbers of drugs used	< Residential Student Assistance Program (CSAP Grant #618*) [1, 2, 4,] (13–17 years, Indicated)
	< Life/social skills training	< Lower delinquency and better school adjustment after social skills training	< Tremblay et al. (1994)
		< Increased knowledge of psychological, personal, and social problems associated with use of illicit substances	< Family MAASAI (CSAP Grant #3044) [1, 2] (8–14 years, Selective)
	< Case management approach, involving in-school intervention programs, technical training, cultural awareness, and therapy	< Decreased procriminal values for the treatment group	< African American Adolescent Alcohol and Drug Program (CSAP Grant #537)[2, 3, 4] (12–23 years, Selective)

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
	< Life skills training/ Values Clarifi-cation and Anti-Violence models	< Decreased amount of fighting and trouble with the police	< Early Intervention Program w/Delinquent Substance Using Adolescents (CSAP Grant #326) [2, 4] (13–19 years, Indicated)
	< Mentoring with community members	< Reduced truancy significantly and lowered recidivism for treatment groups	< Fo & O'Donnell (1974, 1975) (Indicated)
	< Home visits	< Reduced adult arrests by age 24	< Perry Preschool Project (Berrueta-Clement et al., 1985)
		< Reduced antisocial behavior in school at age 10 for boys	< Yale Child Welfare Project (Seitz et al., 1985)
		< Reduced antisocial behavior in school at age 10	< Houston Parent-Child Development Center (Johnson & Walker, 1987)

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
Skills:			
< Social competence is associated with decreased likelihood of initiating of continuing use of substances	< Life skills/social skills training (e.g., classroom training, training outside of school, role play)	< Increased ability to refuse alcohol, tobacco, and marijuana	< Family Advocacy Network (CSAP Grant #1383*) [1, 2] (13–17 years, Selective)
		< Decreased levels of tobacco, alcohol, and marijuana use	< Life Skills Training Program (Botvin et al., 1995) [1, 2] (13–17 years, Universal)
		< Increased honest communication with family members and delayed onset of alcohol and drug use	< Creating Lasting Connections (CSAP Grant #1279*) [1, 2, 4, 5] (13–17 years, Selective)
		< Decreased use of alcohol, tobacco, and marijuana and decreased quantity and numbers of drugs used	< Residential Student Assistance Program (CSAP Grant #618*) [1, 2, 4,] (13–17 years, Indicated)
		< Improved skills in goal setting	< Project C.A.R.E. (CSAP Grant #1295) [2] (9 years, Selective)

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
Predispositions:			
< Mental/emotional stress increase risk for initiating or continuing use of substances	< Therapeutic interventions combined with social skills education and artistic engagement	< Improved ability to cope with stress and reduced perceived psychological stress and problems	< Project Self - Discovery (CSAP Grant #4771) [2] (15–18 years, Selective)
< Sense of well-being/self-confidence decreases the likelihood of participating in multiple problem behaviors including substance use	< Community service	< Increased sense of well-being, increased knowledge of community service, and more positive attitudes toward people and the future	< Across Ages [1, 2, 3] (CSAP Grant #2779*) (under 13 years, Selective)
< Risk-taking propensity/ < impulsivity is associated with participating in multiple problem behaviors including substance use	< Public service announcements (PSAs) warning of dangers of drug use and other risk-taking behavior	< Sensation-Targeted PSAs reduced participation in high-risk behavior	< Palmgreen et al. (1995)

Family Domain

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
Skills:			
< Consistency of parenting/ interaction within family is associated with more positive family dynamics and decreased adult predispositions for stress	< Parent education/ parenting skills training	< Increased parental self-esteem and appropriate control techniques	< DARE To Be You (CSAP Grant #1397*) [2] (under 13 years, Selective)
		< Increased parental self-efficacy, parent discipline, and monitoring	< Strengthening Families Program (Kumpfe, Molgaanl, & Spoth, 1996) [1, 2, 4] (under 13 years, Selective)
		< Positive effects on parental standard-setting, monitoring, and discipline and on parent-child affective quality	< Project Family (Spoth, in press) [1, 2] (approximately 13 years, Universal)
		< Increased parenting skills	< Focus on Families (Catalano, in press) [1, 2]
		< Reduced impulsivity	< Schure & Spivak (1979)
		< Reduced parental stress	< Kazdin et al. (1992)
		< Reduced parental negative discipline	< Dishion et al. (1992)

Salient Risk and Protective Factors	**Related Interventions**	**Outcomes**	**Programs and/or Research**
Family Bonding/Cohesion:			
< Positive family dynamics are associated with more positive bonding with family members and gains in social skills	< Parent education/family therapy	< Decreased parental stress	< La Familia Fuerte (CSAP Grant #4860) [2] (6–11 years, Selective)
		< Decreased tobacco use	< Adolescent Transitions Program (Dishion et al., 1996) (11–17 years, Universal, Selective, and Indicated)
	< Task-oriented family education sessions combining social skills training to improve family interaction (e.g., communication skills)	< Increased ability to refuse alcohol, tobacco, and marijuana	< Family Advocacy Network (CSAP Grant #1383*) [1, 2] (13–17 years, Selective)
		< Decreased child behavior problems	< Families And Schools Together (CSAP Grant #3699) [1, 2, 4] (preschool through middle school, Selective)
		< Increased family cohesion	< Families In Action (CSAP Grant #3080) [1, 2] (middle school, Selective)

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
		< Improved bonding with mother, father, and siblings and more honest communication with family members	< Creating Lasting Connections (CSAP Grant #1279*) [1, 2, 4, 5] (13–17 years, Selective)
		< Decreased use of marijuana, cigarettes, and alcohol	< Project STAR (Pentz et al., 1991) [1, 5, 6] (13–17 years, Universal)
		< Improved school performance and behavioral outcomes	< Family Effectiveness Training (Szapocznik et al., 1989, 1996) [1, 2] (under 13 years, Selective)
< Social bonding is associated with decreased likelihood of participating in multiple problem behaviors including substance use	< Parent education and classroom management	< Reduced antisocial behavior, improved academic skills, greater commitment to school, reduced levels of alienation, and better bonding to pro-social others	< Seattle Social Development Project (Hawkins et al., 1992) [1,2] (under 13 years, Universal)

Salient Risk and Protective Factors	**Related Interventions**	**Outcomes**	**Programs and/or Research**
Family Climate: < Family conflict/abuse increases the likelihood that children will initiate substance use	< Home visits	< Decreased child abuse by age 2	< Prenatal/Early Infancy Project (Olds et al., 1986, 1988)
< Parents who are active substance abusers or have history of substance abuse increase likelihood that youth will initiate or continue use of substances	< Individual and parent/child counseling, parent education, play therapy, skill-building for children	< Improved behavioral outcomes among children of recovering substance abusers, decreased tobacco & alcohol use, decreased family conflict, and increased family communication	< Strengthening Families Program (Kumpfer & DeMarsh) [1, 2, 4] (under 13 years, Selective)

Peer Domain

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
Bonding with Antisocial Peers:			
< Inappropriate sexual activity is associated with multiple problem behaviors including substance use	< Classroom and peer support groups reinforcing unsupportive attitudes toward sexual permissiveness	< Increased knowledge about sex and less permissive views of early sexual activity	< SMART leaders (CSAP Grant #903*) [1, 2] (13–17 years, Selective)
< Reinforcement of negative norms and expectations about substance use within peer group increases risk that youth will initiate or continue use of substances	< Guided peer reinforcement of pro-abstinence norms among children with recurrent conduct problems, combined with drug education and peer resistance skill-building		< Peer Support Retreats (Gilder et al., 1991) [1, 2] (under 13 years, Selective)
< Ties to deviant peers/gang involvement is associated with multiple problem behaviors including substance use	< Parent education and classroom management	< Reduced delinquency with weaker effects on drug use	< Seattle Social Development Project (Hawkins et al., 1992) [1,2] (under 13 years, Universal)
	< Involving youth in alternative/recreational activities	< Decreased gang involvement, feeling close to existing gangs, and violence	< The Logan Square Prevention Project (CSAP Grant #2884) [2, 3, 5] (11–14 years, Selective)

Salient Risk and Protective Factors	**Related Interventions**	**Outcomes**	**Programs and/or Research**
	< Peer resistance education	< Increased ability to resist peer pressure and lower involvement with peers who use substances	< South West Texas State University's Program (CSAP Grant #1207) [3] (under 13 years, Selective)
	< Conflict mediation, job and school referrals	< Decreased serious violence	< Spergel (1995)

School Domain

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
Performance:			
< Academic failure/dropping out of school vs. academic achievement is associated with multiple problem behaviors including substance use	< School-based support group and skills development class	< Improved school performance, increased school bonding and social support, and reduced severity of drug problems	< Reconnecting Youth Program (Eggert et al., 1994) [2, 4] (13–17 years, Indicated)
	< Peer tutoring, along with school-based skills development and substance abuse education	< Decreased number of D and F grades received by youth while in the project; the longer in the program, the smaller the increase in use of alcohol, marijuana, inhalants, and polydrugs	< Project Success (CSAP Grant #1268) [2, 4] (7th and 8th grade students, Universal)
	< Tutoring, peer tutoring, homework assistance	< Higher scores on standardized achievement tests	< La Familia Fuerte (CSAP Grant #4860) [2] (6–11 years, Selective)
		< Improved mathematics and reading, greater gains for those in the program for a longer time	< Sunshine Project (CSAP Grant #6068) [2] (elementary and middle schools, Selective)

Salient Risk and Protective Factors	**Related Interventions**	**Outcomes**	**Programs and/or Research**
		< Improved Spanish, social studies, science, and overall grade point average	< Helping Children and Their Families Face Drug Abuse (CSAP Grant #2851) [2] (7–11 years, Selective)
		< Improved reading and math test scores	< ADEPT Drug and Alcohol Community Prevention Project (CSAP Grant #213) [2, 3] (K– 6th grade, Universal)
Bonding: < School bonding is associated with positive attitudes toward school and improved school achievement	< Creating supportive school communities	< Increased liking of school and learning motivation	< Child Development Project (CSAP Grant #2647*) [1, 2, 5, 6] (under 13 years, Universal)
		< Increased school-interest and demonstrated reduced school anxiety	< NTU Project (CSAP Grant #1800) (under 13 years, Selective)
	< Cooperative learning intervention	< Improved grade point averages	< Multi-Model School-Based Prevention Demonstration (CSAP Grant #2630) [2, 4] (middle school, Universal)

Salient Risk and Protective Factors	**Related Interventions**	**Outcomes**	**Programs and/or Research**
< Regular school attendance is associated with positive attitudes toward school	< Mentoring	< Fewer days absent and improved attitudes toward school	< Across Ages [1, 2, 3] (CSAP Grant #2779*) (under 13 years, Selective)
	< Individual and group counseling based on drug education, self-esteem, stress reduction, family/peer relations, decisionmaking skills, and school attitude	< Decreased truancy	< STARS (CSAP Grant #1756) [1, 2] (Grades 9–12, Selective)
Climate (level of use/discipline/ curricula:			
< Positive instructional climate (responsiveness to student needs, classroom management patterns, parent involvement, etc.) is related to improved teacher practices and increases in student-school bonding and student achievement	< Comprehensive school change programs including components to improve parent involvement, change classroom management and/or instructional style, and improve student participation and "school bonding"	< Improved teacher practices led to positive changes in classroom behaviors, which in turn, were related to students' sense of community	< Child Development Project (CSAP Grant #2647*) [1, 2, 5, 6] (under 13 years, Universal)

Salient Risk and Protective Factors	**Related Interventions**	**Outcomes**	**Programs and/or Research**
		< Improved academic skills, greater commitment to school, reduced misbehavior in school, better pro-social bonding, and fewer incidents of drug use in school	< Seattle Social Development Program (Hawkins et al., 1992) (under 13 years, Universal)
< School responsiveness to student needs is associated with reductions in substance use	< Peer tutors and use of school for after-hours enrichment and parent education	< Decreased substance abuse & delinquency and improved grades. Improved school climate and policies through school/community partnership approach.	< Project PATHE (Gottfredson, 1986) (13–17 years) < Project HIPATHE (Kumpfer et al., 1991) (13–17 years)
<u>School policy</u>:			
< School norms/policies discouraging substance use and related behaviors are associated with improved teacher practices and positive student outcomes	< Creation and enforcement of clear drug policies, often accompanied by change in disciplinary codes and installation of security devices	< Increased use of treatment facilities by students, and staff who participated in the workshops more likely to talk to students regarding alcohol, tobacco, and other drug issues and refer students for help	< CASPAR Intervention Project (CSAP Grant #1416) (13–17 years, Selective)

Salient Risk and Protective Factors	**Related Interventions**	**Outcomes**	**Programs and/or Research**
		< Immediate school expulsion policy for possession of substances implemented	< CSAP Model Community Partnership Number 5
	< Changes in teaching approaches and parent involvement, with classroom drug education	< Improved teacher practices led to positive changes in classroom behaviors, which in turn, were related to students' sense of community	< Child Development Project (CSAP Grant #2647*) [1, 2, 5, 6] (under 13 years, Universal)
	< Student Assistance Program, including teacher training, student programming, and school policy change	< School board adoption of school substance abuse policy, purchase of tobacco products by minors declined	< Perth Amboy Community Partnership for Youth (CSAP Grant #1479) [2, 4, 5, 6] (school-aged youth, Universal)
	< Comprehensive health curricula, combined with Student Assistance Program model	< Less than optimal implementation of curricula and failure to adopt Student Assistance Program model, resulted in program failure	< Growing Up Well (CSAP Grant #3073) [1, 2, 5] (6–11 years, Selective)

Community Domain

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
Norms: < Community and societal norms that appear to condone substance abuse increase likelihood youth will initiate or continue to use substances	< Education to alter perceptions of societal norms/expectations < Elimination of "head shops," crack houses, etc., to remove perception of community acceptance of drug use	< Prevented drug use	< Adolescent Alcohol Prevention Trial (Hansen & Graham, 1991) [1, 2] (under 13 years, Universal) < Project SMART (Schinke & Cole, 1995) (13–17 years)
Access: < Convenient access to alcohol, drugs, and/or tobacco increase likelihood youth will initiate or continue to use substances	< Targeted enforcement against drug sales near elementary schools < Establishing "drug-free" sites within communities	< Reduced initiation of marijuana, cigarettes, and alcohol in youth who never used, and increased perceptions of friends' intolerance of drug use	< Project STAR (Pentz et al., 1989; Pentz, 1995) [1, 2, 5, 6] (11–17 years, Universal)

Salient Risk and Protective Factors	**Related Interventions**	**Outcomes**	**Programs and/or Research**
Resources: < Availability of constructive recreation decreases likelihood youth will participate in multiple problem behaviors including substance use	< Establishment of supervised youth recreational/cultural programs	< Decreased levels of substance use, increased assertiveness and cultural pride < Increased ability to cope with stress < Decreased use of alcohol and marijuana < Decreased presence of crack cocaine and community drug dealing activity in public housing with new Boys & Girls Clubs < Decreased gang involvement and violence	< Greater Alliance of Prevention Systems (CSAP Grant #1013*) [1, 3, 5, 6] (13–17 years, Selective) < Project Self-Discovery (CSAP Grant #4771) [3] (15–18 years, Selective) < Project Venture (CSAP Grant #2070) [3] (grades 4–12, Selective) < Reaching HRY in Public Housing (CSAP Grant #767) [2, 3 5] (all ages, Selective) < Logan Square Prevention Project (CSAP Grant #2884) [2, 3, 5] (Selective)
		< Increased ability to resist peer pressure and reduced involvement with peers who use substances	< Southwest Texas State University's Program (CSAP Grant #1207) [1, 2, 3] (under 13 years, Selective)

Salient Risk and Protective Factors	Related Interventions	Outcomes	Programs and/or Research
		< Reduced delinquency incidents	< Project Smart Moves in Boys and Girls Clubs (Schinke et al., 1991)
		< Reduced juvenile arrests	< Jones & Offord (1989)
		< Decreased vandalized housing units and reduced drug use	< Schinke et al. (1992)
< Latchkey status/lack of monitoring of youths' activities increases risk for initiating or continuing use of substances	< After-school recreation/ community service, and drug education	< Reduced incidence of alcohol use among 11- to 14-year-old girls	< Friendly PEERsuasion (Chaiken, 1990) (CSAP Grant #876) (11–14 years, Selective)
	< Mentoring combined with community service and drug education	< Increased sense of well-being, increased knowledge of community service, more positive attitudes toward people and the future	< Across Ages [1, 2, 3] (CSAP Grant #2779*) (under 13 years, Selective)

Salient Risk and Protective Factors	**Related Interventions**	**Outcomes**	**Programs and/or Research**
Mobilization: < Existence of widely supported community prevention efforts reinforce positive messages sent by individual prevention programs to decrease likelihood that youth will initiate or continue to use substances	< Establishment and funding of prevention infrastructure with opportunities for community "ownership"		< Project Northland (Perry et al., 1996) (13–17 years)
			< Project STAR (Pentz et al., 1991)[1, 5, 6] (13–17 years, Universal)
		< Reduced use of illicit drugs, alcohol use	< CSAP Model Community Partnership Number 1
		< Reduced alcohol use	< CSAP Model Community Partnership Number 2
		< Reduced alcohol use	< CSAP Model Community Partnership Number 3
		< Reduced in alcohol use	< CSAP Model Community Partnership Number 4
		< Reduced use of illicit drugs	< CSAP Model Community Partnership Number 5

Salient Risk and Protective Factors	**Related Interventions**	**Outcomes**	**Programs and/or Research**
	< Multiagency activities and collaboration	< Increased coordination between public and private agencies	< CSAP Model Community Partnership Number 1
		< Improved awareness and knowledge of substance use/abuse issues for disabled youth	< Substance Abuse Resources and Disability Issues (CSAP Grant #5074) [1, 2, 5] (disabled youth generally, Selective)
		< Benefitted from being part of the consortium by forming new linkages, and consortia goals and objectives were achieved	< Project Involvement (CSAP Grant #909) [2, 4, 5] (8–17 years, Universal)
		< Strengthened relationship between law enforcement and service providers	< CSAP Model Community Partnership Number 2
		< Strengthened relationships among police, schools, and substance abuse organizations	< CSAP Model Community Partnership 3

Society/Environmental Domain

Salient Risk and Protective Factors	**Related Interventions**	**Outcomes**	**Programs and/or Research**
Access:			
< Low retail prices of alcohol, drugs, and/or tobacco increase likelihood that youth will initiate or continue to use substances	< Increased taxes on alcohol, tobacco	< Increased beer prices reduce frequent youth drinking	< Coate & Grossman, 1988
Norms:			
< Exposure to mass media messages that appear to support substance abuse increase likelihood that youth will initiate or continue to use substances	< PSAs warning of dangers of drug use and other risk taking behaviors	< Sensation-targeted PSAs reduced participation in high-risk behaviors	< Palmgreen et al., 1995
	< Classroom-based "media education" to counter alcohol and tobacco advertising	< Reduced use of marijuana, cigarettes, and alcohol	< Project STAR (Pentz et al., 1989; Pentz, 1995) [1, 2, 5, 6] (11–17 years, Universal)

Chapter 3
Science-based Principles, Practices, and Models

This document has described the basic characteristics of program implementation and research required to produce scientifically defensible results. As described earlier, CSAP applied nine scientific criteria to its own HRY programs to determine which prevention intervention efforts produced scientifically defensible results. The results of this review are presented later; the prevention principles extracted across programs and model programs are listed. First, however, we offer a clear operational definition of science-based program models and principles, to assist program developers, researchers, and policy analysts in their decision making in regard to funding and implementing intervention programs.

Toward An Operational Definition of the Term "Science-Based"

Recognizing that the nine review criteria can be applied to other efforts as well, similar evaluations and syntheses of information from Community Partnership and PPWI programs are currently under way. It is also clear that these nine criteria, in some form, lie at the heart of evaluations made by expert panels or reviewers of refereed journals, where credibility of the findings is judged, with the basis of this judgment residing in the rigor of research methods and quality of implementation. In this regard, expert consensus panels of all types, including those focused on developing practice evidence and implementation reviews, are alike. They may differ in the level of quantification of their review process, but they all nonetheless use some variant of the nine general review criteria discussed here. Just as replications of program efforts and their findings increase the certainty that the interventions are effective, consensus required among reviewers/practitioners regarding their assessments of the merits and impacts of various practices and their effectiveness increases our confidence that our observations are real.

The term "science-based" refers to the process by which knowledge is derived. "Science-based" information is that which has been identified and/or substantiated through an expert consensus or analytic process using commonly agreed upon criteria for rating research endeavors. Additionally, conceptual or exact replications add to the credibility that findings, principles, or models are effective. Science-based results are derived via similar processes, whether those results are reported as either program models or prevention principles.

Based on the above assumptions the operational definition of science-based uses discrete, but overlapping, levels of support for the scientific basis of particular principles or

models. Users should determine the level of credibility that best meets their needs. Described below are five types of scientific review processes. Type 1 is considered a review process, but the result does not meet requirements of scientific rigor. Type 2 represents a more rigorous type of review, but still does not reflect scientifically defensible results. Types 3, 4, and 5 represent review processes from which results can be deemed scientifically defensible.

Type 1. The program/principle has been identified or recognized publicly, and has received awards, honors, or mentions.

A. This level of recognition is alone insufficient to ensure that principles derived from the strategy, or the model itself, are effective. To be judged useful, information from the program should have been subjected to review and critique by a panel of judges qualified in the field of substance abuse prevention and in research methods to determine both the quality of implementation of the program intervention and the overall quality of the research plan and analysis. Selection for recognition is often accomplished without such reviews, because other criteria have higher priority.

Type 2. The program/principle has appeared in a nonrefereed professional publication or journal. It is important to distinguish between citations found in professional publications and those found in journals.

A. Professional publications are subject to the same potential problems as other forms of public recognition. Program information that appears solely in such periodicals should be viewed as having suggestive value, but should not be taken as support for a particular program model or principle.

B. Appearance in a nonrefereed professional journal generally offers better information about the credibility of the information. Still, the distinction between a nonrefereed and refereed journal is important. Information published in nonrefereed journals is similar to information in other professional publications and newsletters–it is suggestive, but without substantiation. Refereed journals require that an expert/peer consensus be reached regarding the merit of the work (refereed journals appear under Type 3); this is the minimum requirement for a rating of scientifically defensible.

1. Although appearance in a refereed journal provides a minimum level of certainty regarding the quality of information contained in the paper, such journals do not assure full credibility. When writing a journal article, authors may be very selective about results presented, thereby providing an overly positive

view of their work. Unfortunately, without source documents, referees do not often know what data are missing. Similarly, journals may demonstrate a pronounced "positivity bias," publishing only significant positive results, thus reinforcing authors' selective reporting.

Type 3. The program's source documents have undergone thorough scrutiny in a expert/peer consensus process for the quality of implementation and evaluation methods, or a paper has appeared in a peer-reviewed journal.

A. Unlike journal reviews, complete source documents are scrutinized. All dosage information and data collection processes are detailed, all analyses are presented for review. Reviewers, experienced in the substance abuse prevention field and trained as evaluators, code both the implementation variables and activities, as well as the findings. The project is rated for producing credible information regarding principles of prevention, and a summary judgment regarding the potential of the program model for prevention is made. Processes like those used in developing the HRP DataBank yield useful data regarding the scientific basis of information derived from specific projects.

1. Ratings made in exercises like these differentiate between studies producing highly defensible findings (i.e., integrity ratings of 4 or 5) and those less capable of standing on their own, serving primarily a corroborative function (i.e., integrity rating of 3). Reviewers should be cautioned to keep these distinctions in mind.

B. A report of study methods and findings appears in a peer-reviewed journal.

Type 4. The programs/principles have undergone either a quantitative meta-analysis or an expert/peer consensus process in the form of a qualitative meta-analysis.

A. Here, multiple studies are reviewed and coded, generally first for the quality of methodological rigor and then for findings. Often, dosage and other implementation characteristics are also coded. Analysis takes place across programs, and principles of prevention are identified. In addition, common activities or prevention strategies that produce consistently positive findings can be enumerated. Because these principles receive support across a broad array of program interventions and evaluation strategies, we gain confidence that the principles are real and solidly defensible. Similarly, because strategies are consistently linked to positive outcomes, we gain confidence that they relate causally to the observed effects.

Some of the principles discussed in this paper derive from such an effort with the HRP DataBank.

1. Whereas quantitative meta-analytic efforts generally produce defensible conclusions regarding common successful principles and strategies, qualitative meta-analyses may yield less certain conclusions. The problem with qualitative methods is that there is no way of systematically aggregating or weighing specific findings; thus, estimates of overall links between interventions and outcomes are less precise. Still, qualitative analyses can produce clearly defensible findings regarding both principles and strategies when results are relatively consistent. If results are inconsistent, qualitative analyses provide insight as to the critical variables that determine when a strategy might be effective and when it might fail.

Type 5. Replications of program/principle have appeared in several refereed professional journals.

A. The best evidence of a program model's effectiveness is that it can be replicated across venues and populations, demonstrating credibility, utility, and generalizability. Projects fulfilling these requirements occupy the top portion of the data collection pyramid (Figure 1).

1. Programs can be replicated exactly or principles derived from programs can be replicated conceptually. Exact replications simply apply the original program to a new population or in a new venue. Conceptual replications adapt the program, maintaining its key principles but modifying specific activities. Both add to the certainty about the scientific basis of the program–exact replications speak most directly to the program model whereas conceptual replications also address prevention principles.

2. Evidence of replication should be found in refereed journal articles or meta-analytic efforts. Evidence should be unique so that each publication represents a separate program intervention effort. The scientific basis of a program is not strengthened when the same data are published in three different journals, or when different authors all cite the same original study.

B. Successful replication of an effective program model also provides support for the principles on which the program is based and the intervention strategy as a whole. Meta-analytic techniques can be used to identify successful strategies and principles across program models.

Validation Table

The five types of validation discussed above as part of the operational definition of science-based prevention can be mapped against the integrity of program implementation and methodological rigor (Table 1). Three validation processes inherent in the definition of science-based prevention (i.e., Types 3, 4, and 5), define those procedures that can yield scientifically defensible findings. Also, integrity ratings reflect how much confidence a reviewer has in reported findings. Scientifically defensible findings have integrity ratings of 3, 4, or 5, with 3 representing promising findings and 4 and 5 representing findings from model programs. Mapping integrity ratings onto the types of science-based validation processes enables us to explore their intersection–the point at which specified rigorous validation procedures produce scientifically defensible results.

Science-based prevention findings are those programs/principles/data that have been identified via process Types 3 through 5 of the operational definition with integrity ratings of 3 to 5. These types of programs/principles fall within the table cells marked with the following pattern:

The shaded cells of the table are not science-based practices, however, some cells represent programs/principles that may be promising or innovative. These types of endeavors fall within the cells with the following pattern:

With further evidence, innovative programs/principles can move through the types of science-based processes toward more credibility.

Prevention Principles

Several different sources of information, all derived from some form of expert consensus evaluation, including qualitative meta-analytic procedures (e.g., practice implementation panels), qualitative meta-analytic techniques using specific rating criteria (e.g., CSAP's HRY Populations DataBank), and quantitative meta-analytic techniques (e.g., CSAP-

Table 2

Types of Validation Processes

Integrity Ratings:	Type 5	Type 4	Type 3	Type 2	Type 1
5					
4					
3					
2					
1					

Integrity Ratings:
1 = no confidence
2 = weak, at best some confidence in results
3 = mixed, some weak, some strong characteristics
4 = strong, fairly good confidence in results
5 = high confidence in results, findings fully defensible

Types of Validation Processes:
Type 1 = public recognition, awards
Type 2 = article appears in professional publication or nonrefereed journal
Type 3 = expert/peer consensus process or paper appears in a refereed journal
Type 4 = qualitative or quantitative meta-analyses
Type 5 = replications of program/principle appears in several refereed professional journals

sponsored NCAP study of the Correlates of Marijuana Use), were used in this effort both to develop principles of effective intervention and identify model programs. Principles are presented below, followed by model programs.

The following prevention principles were extracted from the Data Matrix or derived from other meta-analytic efforts reviewed (see reference sections for the source documents). These principles do not represent the universe of the lessons learned from the studies and intervention efforts cataloged in the Data Matrix, or lessons learned from efforts not included in this effort. Instead, these principles should be viewed as preliminary, and the Data Matrix should be viewed as a "work-in-progress." General prevention principles are presented first, followed by sets of principles specific to CSAP domains, in conformance with the Data Matrix. Finally, the principles are reorganized within CSAP's six prevention strategies to enable easy identification of strategies of interest.

When one is contemplating adopting science-based principles, several considerations apply. First, adopting multiple prevention principles should not result in cumulative effectiveness for prevention programming. In other words, a greater quantity of principles used does not necessarily result in greater program effectiveness. Second, if the core of a program is poorly designed or poorly implemented, applying science-based principles may improve outcomes but will still fall short of producing effective programs. Third, program developers must use caution when applying multiple prevention strategies in order to not employ countervailing principles. In other words, principles should complement one another. Fourth, and finally, additional prevention principles other than those presented below can be identified provided the group intending to employ the principle of interest can justify the process by which that principle was identified and can explain the logic of how the principles work together.

General Prevention Principles

- Applying a science-based framework for prevention requires a thorough understanding of substance-related problems, the factors that appear to cause or contribute to these problems (risk factors), and the strategies that can affect these risk factors or enhance protective factors. In other words, prevention strategies do not affect substance-related problems directly. Rather, they attempt to affect risk or protective factors that appear to cause or guard against problems (Hansen, 1997; Reynolds, Stewart, & Fisher, 1997).

- The more closely a risk factor is related to the identified problem, the more likely it will have a measurable impact on the problem (Hansen, 1997; Reynolds et al., 1997). Careful examination of the research literature will help identify those risk factors most closely related to specific problems.

- Selection of a particular prevention strategy or intervention should be guided by research-based evidence showing a strong likelihood that the intervention will, in fact, bring about the desired change in the factor (Reynolds et al., 1997; SAMHSA/CSAP,

1997b). Research and evaluation literature can provide this information and assist in the design of effective strategies.

- Successful intervention implementations rely on continuous, rigorous evaluation to determine if benchmarks and standards have been met and if desired outcomes have been achieved (Reynolds et al., 1997; SAMHSA/CSAP, 1997b).

Prevention Principles by Domain

Individual Domain

Risk factors for substance abuse in the Individual Domain include lack of knowledge regarding the harms of substance us, attitudes favorable toward use, early use, biological or psychological dispositions, antisocial behavior, sensation seeking, and lack of supervision. The prevention principles listed below address these risk factors where research has made such assertions possible.

- Knowledge-oriented interventions about harms and risks associated with substance use and abuse cannot, by themselves, produce measurable and long-lasting changes in substance abuse-related behavior and attitudes (Goodstadt, 1974; Hansen, 1992).

- Attitudes favorable toward use can be influenced through normative education, but normative education alone (i.e., education designed to correct misperceptions about the prevalence of use and attitudes favorable toward use) is not sufficient as a prevention approach (Sussman et al., 1993). Normative education has been shown to be most effective in reducing substance use when combined with other educational approaches such as fostering social skills (Hansen & Graham, 1991).

- Educational interventions that incorporate social and personal skills building curricula are an effective way of enhancing individual capacities, attitudes, and behavior inconsistent with use. Frequently, these interventions also incorporate the conveyance of information about the harms associated with substance use as well as about social norms or other complementary strategies (Bell, Ellickson, & Harrison, 1993; Botvin, Baker, Dusenbury, Botvin, & Diaz, 1995; Ellickson, Bell, & McGuigan, 1993; Hansen, 1996; Pentz et al., 1990; Schinke & Cole, 1995; Tobler, 1986, 1992).

- Didactic approaches are among the least effective educational strategies (Tobler, 1986). Research suggests that interactive approaches (such as those characteristic of skills-building educational approaches and peer-led education) engage the target audience more effectively (Botvin, Schinke, Epstein, & Diaz, 1994; Connell et al., 1985;

Johnson et al., 1990; Perry et al., 1996; Shope, Kloska, Dielman, & Maharg, 1994; Walter, Vaughn, & Wynder, 1989). These approaches include cooperative learning, role plays, and group exercises.

- Educational interventions for youth that are peer led or include peer-led components are more effective than adult- or teacher-led approaches (Errecart et al., 1991; Tobler, 1986, 1992). Peer-led programs tend to require extensive prior instruction for peer educators, however.

- Information dissemination and media campaigns, although complementary to more intensive and interactive individual-oriented prevention approaches, do not play a major part in influencing individual knowledge, attitudes, and beliefs. Effective use of the media is primarily demonstrated when the intervention is combined with other prevention strategies, for example, education (Flynn et al., 1992; Flynn, Worden, Secker-Walker, Badger, & Geller, 1995; Flynn et al., 1997).

- Individual-oriented interventions should appeal to salient motives for using substances; for example, young people tend to be more concerned about immediate effects of smoking rather than the long-term effects (Flay & Sobel, 1983; Flynn et al., 1997; Paglia & Room, 1998). For individuals concerned with social acceptance by peers, effects such as foul residual odor or stained teeth are likely to be more salient than the threat of lung cancer decades later.

- Individual-oriented interventions should be tailored to be as attractive and as engaging as possible (Botvin, Schinke, Epstein, & Diaz, 1995; Flynn et al., 1997; SAMHSA/CSAP, 1996). This requires recognition that race, ethnicity, age, and gender influence how well received and effective the intervention will be.

- Alternatives provide a natural and effective way of reaching individuals who may already be disengaged from schools (and therefore do not respond to school-based educational programs). Enjoyable activities offered to these high-risk youth may provide an incentive for involvement and provide an opportunity for more structured prevention interventions that can incorporate the development of personal and social skills (SAMHSA/CSAP, 1996).

- Indicated prevention interventions for youth (interventions that seek to change the knowledge, behaviors, and attitudes of early users) should recognize the multidimensional nature of youth substance abuse patterns: including experimental use that does not progress to abuse or problem behavior (Bates & Labouvie, 1997).

- Indicated interventions should not ignore the relationship between substance use and a variety of other adolescent health problems such as mental health problems, family problems, early and unwanted pregnancy, sexually transmitted diseases, school failure, and delinquency. This clustering of problems greatly shapes the identification of desired program effects (Jessor & Jessor, 1977).

- Indicated interventions can pose risks to the youth involved. The labeling associated with these intensive approaches may increase the probability of future deviance. Another risk may result from exposing youth who engage in experimental substance use to youth with more problematic substance abuse and other deviant behaviors (Mechanic, 1978).

Family Domain

Family Domain risk factors have been defined as including parental and sibling drug use or approval of use, inconsistent or poor family management practices, lack of parental involvement in children's lives, family conflict, differential family acculturation, and low family bonding. The prevention principles listed below address these risk factors where research has made such assertions possible.

- Research shows that educational approaches targeting the family (parents and children) and school-based approaches involving parents or complementing student-focused curricula with parent-focused curricula can be effective in preventing adolescent substance use (Dishion, Andrews, Kavanagh, & Soberman, 1996; Hawkins, Catalano, & Associates, 1992; Kumpfer, Molgaard, & Spoth, 1996; Pentz et al., 1989; Pentz, 1995; Walter et al., 1989).

- Some of the issues involved in differential family acculturation include the presence and importance of the extended family, influence of immigration or circular migration, different language abilities within families, influence of religion and folk healers, influence of voluntary and social organizations, and stresses experienced by families as a result of socioeconomic status and racism. Prevention interventions that acknowledge and address one or more of these issues have produced positive effects (Kumpfer & Alvarado, 1995; Kumpfer, Williams, & Baxley, 1997).

- Selective interventions (interventions that target high-risk populations) with families have been shown to be effective in enhancing protective factors or producing positive substance abuse-related outcomes (Bry, 1994; Olds, 1997).

- Indicated family-based interventions (with substance-abusing parents) have been shown to improve parenting skills, reduce parents' drug use, improve child behavior, and reduce levels of substance use (Kumpfer et al., 1996). However, these interventions tend to require what some may consider a lengthy period of involvement (at least 12 to 15 sessions and sometimes much longer).

- Indicated prevention programs can involve family therapy or family counseling to improve communication and foster attachment in families of delinquent youth *(The Role of Problem Identification and Referral in Substance Abuse Prevention*; Kumpfer, 1997).

- Effective family programs emphasize family bonding through opportunities for joint participation in activities *(Substance Abuse Prevention: A Review of the Key Elements of Educational Approaches in School-Based, Family-Based, and Workplace Prevention)*. Programs also provide training in communication (Kumpfer & Baxley, 1997). This training better ensures that parents have the skills to listen and communicate in ways appropriate to the age and developmental stage of youth. Programs also train parents to use positive and consistent discipline techniques and to monitor and supervise their children (DeMarsh & Kumpfer, 1986).

- Interactive techniques are important in promoting the development of new skills in programs that seek to improve communication within the family (*Substance Abuse Prevention: A Review of the Key Elements of Educational Approaches in School-Based, Family-Based, and Workplace Prevention)*. Interpersonal skills develop through use of techniques such as modeling, coaching, rehearsal, and role play.

- Recruitment of parents for universal and selective family-based prevention programs is often difficult. Effective recruitment of parents is dependent on innovative ways of thinking about increasing parental involvement (Cohen & Linton, 1995; Resnik & Wojcicki, 1991). Some incentives for participation are providing transportation and child care and scheduling the program at times most appropriate to parents.

- Retention of parents in family-based programs appears to be a considerable obstacle (Botvin, 1995; Pentz, 1995). One way to overcome this problem is by facilitating development of bonds among the parents in the program. This is believed to be a key element in retaining parents in indicated programs (Cohen & Linton, 1995; Resnik & Wojcicki, 1991). Another key element for retaining parent involvement is developing programs that are culturally sensitive (Kumpfer & Alvarado, 1995).

- Community and social institutions other than schools should be explored as sponsoring agencies of family-focused interventions. In some communities, schools are not well regarded or accessible during nonschool hours. Churches and community recreation centers appear to be promising alternatives (Johnson et al., 1996; Kumpfer et al., 1996).

Peer Domain

The principal risk factors associated with the Peer Domain are norms favorable toward use and activities conducive to use[1]. The prevention principles listed below address these risk factors where research has made such assertions possible.

- Structured alternative activities and supervised alternative events (e.g., sober prom and graduation parties) offer peers an opportunity for social interaction in settings antithetical to substance use (SAMHSA/CSAP, 1996).

- Alternative activities that incorporate social and personal skills-building opportunities are more likely to be effective with high-risk youth who may not have adequate adult supervision or access to a variety of activities and who have few opportunities to develop the kinds of personal skills needed to avoid behavioral problems (Tobler, 1986).

- More intensive alternative programs that include a variety of approaches seem to be most effective. Those programs that provide intensive interventions, including many hours of involvement with the program and related services, are most effective (Everyday Theater Youth Ensemble, 1993; Howard, 1993; Schaps, DiBartolo, Moskowitz, Palley, & Churgin, 1981; Tobler, 1986).

- Alternative events communicate peer norms against use of alcohol and illicit drugs. They also serve as community statements against that support and celebrate a no-use norm (SAMHSA/CSAP, 1996).

- The effectiveness of approaches directed at youth in nonacademic social settings depends on the nature of the alternatives offered (SAMHSA/CSAP, 1996). If the

[1]This risk factor was added to provide a logical framework for some strategies related to alternatives.

alternative activity offered is not attractive or appropriate, it will not garner participation. Recently, preventionists have involved youth in development of alternatives programs (Armstrong, 1992).

School Domain

The risk factors associated with the School Domain include lack of commitment to education, poor grades or school failure, lack of attachment to school, school climate, and school policies that are lenient with regard to the use of some substances (e.g., tobacco). The prevention principles listed below address these risk factors where research has made such assertions possible.

- School domain risk factors may be related to lack of a satisfying academic experience. One approach to addressing these risk factors is prevention interventions involving academic skills-building. This particular type of skills-building is a component of many after-school alternative activities (SAMHSA/CSAP, 1996).

- Lack of attachment to school may also result from lack of future-oriented goals dependent on the acquisition of education. Mentoring programs have been designed, in part, to foster the development of such goals with some degree of effectiveness in the area of substance abuse prevention (LoSciuto, Rajala, Townsend, & Taylor, 1996; Tierney, Grossman, & Resch, 1995).

- School climate may contribute to lack of attachment to school and can be influenced by the instructional methods of teachers, classroom management techniques, class size, student-teacher ratio, classroom organization, and attitudes of teachers and administrators toward students. Approaches for addressing these influencing factors—although not specifically for the purpose of substance abuse prevention—are documented (Battistich, Schaps, Watson, & Solomon, 1996; Felner et al., 1993; Flay, 1987b).

- School policies that communicate a commitment to substance abuse prevention include formal no-use policies for students, teachers, administrators, and other staff, as well as training for teachers and administrators and a health education program that includes the most promising prevention curricula (Paglia & Room, 1998).

- Other school-related policies that have not yet been extensively evaluated to determine effectiveness in countering risk factors or reducing levels of substance abuse are drug testing and the use of drug-sniffing dogs (Paglia & Room, 1998). The possible negative effects of such strategies must be considered.

Community Domain

Community Domain risk factors include lack of bonding to social/community institutions, norms favorable toward use or abuse, lack of resources for prevention efforts, lack of community awareness or acknowledgment of the problem, and lack of community ability to addresses the problem of substance abuse. The following list of prevention principles address these risk factors where research has made such assertions possible.

- Social institutions other than schools and families include churches and other community "hubs" such as community centers (e.g., Boys and Girls Clubs, YMCA/YWCA) and community-based groups (e.g., scouts). These types of institutions often provide individuals with opportunities to develop personal capacities as well as opportunities for interaction with prosocial peers in constructive endeavors (Johnson et al., 1996; SAMHSA/CSAP, 1996).

- Alternative activity events serve to establish strong community norms against misuse of alcohol and use of illicit drugs. Although a one-shot community event may not change the behavior of participants, such an event can serve as strong community statement that supports and celebrates a no-use norm. Such events also draw public and media attention to alcohol and drug issues and therefore increase awareness and support for other important prevention efforts. For these alternative activities to be truly effective, however, they must be viewed not as ends in themselves, but rather as components of an integrated, comprehensive prevention strategy (Paglia & Room, 1998; SAMHSA/CSAP, 1996).

- Controls on environments around schools and other areas where youth congregate also convey strong community norms against substance abuse. These controls include restrictions on density of alcohol and tobacco outlets, setback distances of alcohol and tobacco outlets, restrictions on advertising near schools (e.g., placement of billboards), and establishment of drug-free zones that set standards for adult as well as youth behavior *(Schools and the Community Alcohol, Tobacco and Other Drug Environment: Opportunities for Prevention)*.

- Use of mass media is an appropriate approach for influencing community awareness and community norms (Paglia & Room, 1998). In order to be more effective, youth-oriented mass media campaigns should identify target audiences and recognize that within the target audience perceptions and abilities may vary based on gender and stage of cognitive development (Flynn et al., 1997).

- Mass media campaigns should set objectives for each message delivered, for example, show positive expectations for nonuse or show lower occurrence of use among youth. Messages should also avoid the demonstration of use of harmful substances, and the campaign should be of sufficient intensity and duration (Flynn et al., 1992, 1995, 1997).

- Effective use of mass media to affect or change community awareness and norms requires paying for television and radio "spots" in choice air times, when members of the target audience are more likely to be viewing or listening. Public service announcements (PSAs) can enhance any media campaign but by themselves are unlikely to have an impact on youth if they air at times when few people are tuning in (Flynn et al., 1997).

- Although drug prevention research started with a focus on youth, the workplace can be an important partner in prevention. The U.S. Department of Health and Human Services calls the workplace "the single most important channel to systematically reach the adult population through health information and health promotion programs" (Pelletier, 1996).

- Community employers can be encouraged to become more active in prevention efforts by emphasizing the costs to employers of workers' substance use and abuse. These costs include lost productivity and health care costs borne by the company health insurance plan for employees (Cook, Back, & Trudeau, 1996; Frankish, Johnson, Ratner, & Lovato, 1997; Roman & Blum, 1992).

- Workplace cultures can condone use (e.g., company events in which alcohol is provided or lack of a smoke-free work environment policy) and availability of substances (e.g., onsite cigarette vending machines). When employers communicate company policy disapproving of use or abuse, workplace norms are likely to change (Ames & Janes, 1987; Cook et al., 1996).

- Work settings can provide drug abuse prevention services in a number of ways, such as health promotion campaigns that serve to raise a community's awareness and as part of the managed care services provided by employers (Lusk, 1997). Managed care services can require prevention education, screening, and early treatment for substance users (e.g., nicotine patch) to further stress the importance of prevention within a community-like setting and to promote the importance of cessation for "community" members.

- Community mobilization efforts have been shown to be effective in raising awareness about the problem of substance abuse and in coordinating prevention and treatment services (Phillips & Springer, 1997; Yin & Kaftarian, 1997). Coalition membership must be appropriate to the shared purpose and plan for action. If comprehensive service coordination is the task, organization leaders need to be involved, especially if an organization is expected to be a key contributor to a particular intervention (Klitzner et al., 1993; Warren, Rodgers, & Evers, 1975; Yin & Kaftarian, 1997). If raising community awareness and stimulating community action is the task, grassroots activists and community citizens must be involved (Christenson, Fendley, & Robinson, 1989; Edelman & Springer, 1995; Yin & Kaftarian, 1997). Community linkage coalition models require a mix of both types of community members (Chavis & Florin, 1991). This results in diverse expectations and operating assumptions for the coalition that must be resolved in order to avoid conflict and role confusion (EMT Associates, 1994).

- Active membership participation in a coalition depends on meeting the needs of members (Phillips & Springer, 1997). Community leaders and professionals seek accomplishments related to their organizational interests and receive rewards through the organizational aspects of the coalition and through the distribution of resources. Citizen activists and members seek a useful application of their time and receive rewards from participation in program activities and not in activities related to organizational maintenance (SAMHSA/CSAP, 1997a).

- Appropriate organization can facilitate collective action. Coalition-based community interventions tend to devote a lot of energy, at least initially, on developing organizational structure and procedures (committees, task forces, roles, responsibilities). Experience indicates that elaborate committee structures are not productive and sometimes are counterproductive (Klitzner et al., 1993). Committees or task forces with specific purposes or responsibility for specified programmatic activity sustain higher membership (Phillips & Springer, 1997).

- Planning is critical and should be adapted to the coalition's purpose, organization, and membership (Phillips & Springer, 1997). A coalition must begin with a clear understanding of the substance-related problems it seeks to change. Information about these problems should be validated through available empirical evidence. Once outcome-based objectives are set, specific action plans can be developed (Phillips & Springer, 1997; Reynolds et al., 1997; SAMHSA/CSAP, 1997b).

- Coalition-based community processes must approach their strategies and programmatic actions from an outcome-based perspective and must be ready to make adjustments to the plan of action in order to meet these outcome-based goals (Phillips

& Springer, 1997; SAMHSA/CSAP, 1997b). The effectiveness of community-based processes is not a reflection of a coalition's organizational structure or design. It is a function of strategies and activities. If the intervention appears to be ineffective, changes and adjustments in the coalition's action plan, not its organizational structure, are required (Edelman & Springer, 1995; Nistler, 1996; Phillips & Springer, 1997; Springer, Phillips, & Edelman, 1996).

- Clear purpose, appropriate planning, and commitment to results will produce effective collective action. Community-based processes will break the traditional bounds of organizational inertia and pathology only if the primacy of purpose is recognized and an action strategy is shaped by research-based findings on effective interventions (Phillips & Springer, 1997).

Society/Environmental Domain

Risk factors in the Society Domain include norms tolerant of abuse, policies enabling abuse, lack of enforcement of laws designed to prevent use and abuse, and inappropriate negative sanctions for abuse. The following prevention principles address these risk factors where research has made such assertions possible.

- Longer lasting effects should accrue from changing school, family, and societal norms that promote and maintain drug problems in youth. More prevention specialists are considering moving the focus from the individual to changes in total systems or environmental contexts that promote or hinder use (Kumpfer, 1997).

- Community awareness and media efforts can be effective tools for increasing perceptions regarding the likelihood of apprehension and punishment and can reduce retailer noncompliance (Foster, Hourigan, & McGovern, 1992; Keay, Woodruff, Wildey, & Kenney, 1993). They also offer a means for changing social norms to be less tolerant of sales to and use by minors and for decreasing the costs of law enforcement operations.

- Counteradvertising campaigns that disseminate information about the hazards of a product or the industry that promotes it may help reduce cigarette sales (Lewit, Coate, & Grossman, 1981; Schneider, Klein, & Murphy, 1981) and tobacco consumption (Chaloupka & Grossman, 1996; Flay, 1987a; Wallack & DeJong, 1995). The limited research on alcohol warning labels suggests they may affect awareness, attitudes, and intentions regarding drinking but do not appear to have a major influence on behavior (Gordis, 1996; Hilton, 1993). Studies have suggested that more conspicuous labels would have a greater effect on awareness and behavior (Barlow & Wogalter, 1993;

Laughery, Young, Vaubel, & Brelsford, 1993; Malouff, Schutte, Wiener, Brancazio, & Fish, 1993).

- Restrictions on use in public places and private workplaces (also known as “clean indoor air” laws) have been shown to be effective in curtailing cigarette sales (Chaloupka & Saffer, 1992) and tobacco use, because both lower smoking prevalence and lower average daily cigarette consumption among adults and youth (Chaloupka, 1992; Chaloupka & Grossman, 1996; Chaloupka & Pacula, 1998; Evans, Farrelly, & Montgomery, 1996; Ohsfeldt, Boyle, & Capilouto, 1998; Wasserman, Manning, Newhouse, & Winkler, 1991). Additional benefits of clean indoor air laws are that they reduce nonsmokers’ exposure to cigarette smoke and that they help to alter norms regarding the social acceptability of smoking (U.S. Department of Health and Human Services, 1994). The effects of restrictions on alcohol use have not been systematically evaluated.

- Education and training programs are important to teach servers about alcohol-related laws, the penalties for violation, how to recognize signs of intoxication and false identification, and how to refuse sales, but they generally are not sufficient when used alone to produce substantial and sustained shifts in compliance with laws (Altman, Rasenick-Douss, Foster, & Tye, 1991; DiFranza & Brown, 1992; DiFranza, Savageau, & Aisquith, 1996; Skretny, Cummings, Sciandra, & Marshall, 1990). When server training is combined with enforcement of laws (against service to intoxicated patrons, against sales to minors), training programs are much more effective in producing changes in selling/serving practices (Cummings & Coogan, 1992; Feighery, Altman, & Shaffer, 1991; McKnight & Streff, 1994).

- Increasing the price of alcohol and tobacco through excise taxes is an effective strategy for reducing consumption, both prevalence of use and amount consumed by users (Chaloupka & Grossman, 1996; Edwards et al., 1994; Evans & Farrelly, 1997; National Cancer Institute, 1993; U.S. Department of Health and Human Services, 1989, 1992). Price increases also can reduce various alcohol-related problems, including motor vehicle fatalities (Saffer & Grossman, 1987); driving while intoxicated, rapes, and robberies (Cook, 1981; Cook & Moore, 1993; Cook & Tauchen, 1984); cirrhosis mortality (Cook & Tauchen, 1982); and suicide and cancer death rates (Sloan, Reilly, & Schenzler, 1994). However, efforts to drive up the price of illicit drugs through law enforcement efforts (source-country crop destruction, interdiction, and disruption of distribution networks) have been relatively ineffective in reducing drug sales.

- Increasing the minimum purchase age for alcohol to age 21 has been effective in decreasing alcohol use among youth (O’Malley & Wagenaar, 1991; Wagenaar, 1993),

particularly beer consumption (Berger & Snortum, 1985) and in reducing alcohol-related traffic crashes (National Highway Traffic Safety Administration, 1995; Toomey, Rosenfeld, & Wagenaar, 1996; U.S. General Accounting Office, 1987; Wagenaar, 1993). It is associated with reductions in other alcohol-related problems, including deaths resulting from suicide, pedestrian injuries, and other unintentional injuries (Jones, Pieper, & Robertson, 1992); and youth homicide (Parker & Rebhun, 1995). Outcomes related to minimum purchase age laws for tobacco are not known because such laws have only recently begun to be enforced.

- Limitations on the location and density of retail alcohol outlets may help contribute to reductions in alcohol consumption (Gruenewald, Ponicki, & Holder, 1993), traffic crashes (Gruenewald & Ponicki, 1995b; Scribner, MacKinnon, & Dwyer, 1994), and certain other alcohol-related problems, including cirrhosis mortality (Gruenewald & Ponicki, 1995a), suicide (Gruenewald, Ponicki, & Mitchell, 1995), and assaultive offenses (Scribner, MacKinnon, & Dwyer, 1995). With respect to illicit drugs, neighborhood antidrug strategies such as citizen surveillance and the use of civil remedies, particularly nuisance abatement programs, can be effective in dislocating dealers and reducing the number and density of retail drug markets and possibly other crimes and signs of physical disorder within small geographical areas (Davis, Smith, Lurigio, & Skogan, 1991; Eck & Wartell, 1997; Green-Mazerolle, Roehl, & Kadleck, 1997; Lurigio et al., 1993; Rosenbaum & Lavrakas, 1993; Smith, Davis, Hillenbrand, & Goretsky, 1992).

- Enforcement of minimum purchase age laws against selling alcohol and tobacco to minors using undercover buying operations (also known as “decoy” or “sting” operations) can substantially increase the proportion of retailers who comply with such laws (Center for Research in Disease Prevention, Stanford University, 1994; Cummings & Coogan, 1992; Feighery et al., 1991; Forster et al., 1997; Jason, Ji, Anes, & Birkhead, 1991; Michigan State Police, 1989; Preusser, Williams, & Weinstein, 1994). Undercover buying operations conducted by community groups that provide positive and negative feedback to merchants are also effective in increasing retailer compliance (Biglan et al., 1995; Lewis, Huebner, & Yarborough, 1996).

- More frequent enforcement operations lead to greater reductions in retailer noncompliance (Jason, Billows, Schnopp-Wyatt, & King, 1996; Preusser, et al., 1994).

- “Use and lose” laws, which allow suspension of the driver’s license of a person under 21 years of age following a conviction for any alcohol or drug violation (e.g., use, possession, or attempt to purchase with or without false identification), are an effective

means for increasing compliance with minimum purchase age laws among youth (Preusser, Ulmer, & Preusser, 1992). Penalties should be swift, certain, and meaningful (Gibbs, 1975; Ross, 1992). Penalties should not be too harsh, however, because their severity is not related to effectiveness, and if they are too severe, law enforcement and judicial officers may refuse to apply them.

- Deterrence laws and policies for impaired driving have been effective in reducing the number of alcohol-related traffic crashes and fatalities among the general population and particularly among youth. Reducing the legal Blood Alcohol Content (BAC) limit to .08 or lower in criminal per se laws has been shown to reduce the level of impaired driving (Kloeden & McLean, 1994) and alcohol-related crashes (Hingson, Heeren, & Winter, 1994; Johnson, 1995).

- Enforcement of impaired driving laws is important to deterrence because it increases public perception of the risk of being caught and punished for driving under the influence of alcohol. Law enforcement efforts to detect and arrest drinking drivers include sobriety checkpoints, which do not result in high levels of detection of drinking drivers (Ferguson, Wells, & Lund, 1995; Jones & Lund, 1985), and passive breath sensors that allow police officers to test a driver's breath without probable cause and substantially increase the effectiveness of sobriety checkpoints (Ferguson, et al., 1995; Voas, Rhodenizer, & Lynn, 1985).

- In terms of penalties for impaired driving, administrative license revocation has been shown to reduce the number of fatal traffic crashes. This allows confiscation of the driver's license by the arresting officer if the driver is arrested with an illegal BAC or if the driver refuses to be tested (Hingson, 1993; Klein, 1989; Ross & Gilliland, 1991; Zador, Lund, Fields, & Weinberg, 1989). It also reduces recidivism among Driving Under the Influence (DUI) offenders (Stewart, Gruenewald, & Roth, 1989). Actions against vehicles and tags have been mostly applied to multiple DUI offenders, with some preliminary evidence that they can lead to significant decreases in recidivism and overall impaired driving (Voas & Tippetts, 1994).

- Impaired driving policies targeting underage drivers– particularly zero tolerance laws setting BAC limits at .00 to .02 percent for youth and graduated driving privileges, in which a variety of driving restrictions are gradually lifted as the driver gains experience and maturity–have been shown to significantly reduce traffic deaths among young people (Blomberg, 1993; Hingson, Heeren, Howland, & Winter, 1993; Hingson, Heeren, & Winter, 1994; National Transportation Safety Board, 1993; Sweedler, 1990).

Prevention Principles by CSAP Strategies

Information Dissemination

- Educational programming regarding alcohol, tobacco, and other drugs can increase knowledge regarding the hazards of substance use and aid in the development of negative attitudes toward alcohol, tobacco, and other drug use (Child Development Project, CSAP Grant #2647; Ellickson et al., 1993; Errecart, 1991; National Center for Health Education, 1991; Storytelling for Empowerment, CSAP Grant #7821; The Woodrock Youth Development Project, CSAP Grant #3094). Programs that involve booster sessions help youth maintain skills over longer periods of time (Botvin et al., 1995; SMART Leaders, CSAP Grant #903).

- Workplace programs for drug-free workplace policies can increase community awareness of drug abuse issues (CSAP Community Partnerships, unpublished document).

- Information dissemination campaigns should be viewed as complementary to more intensive and interactive prevention approaches. Effective use of the media is primarily demonstrated when the intervention is combined with other prevention strategies (e.g., education, enforcement of existing laws). (*The Role of Information Dissemination and Mass Media in Youth-oriented Prevention,* working title, under development at NCAP.)

- Effective use of mass media to change substance-related knowledge, behavior, and attitudes relies on creating messages that appeal to youth's motives for using substances or perceptions of substance use, for example, the perception of risk associated with a particular substance. (*The Role of Information Dissemination and Mass Media in Youth-oriented Prevention,* working title, under development at NCAP.)

- Effective use of mass media requires paying for television and radio "spots" during choice air times, when youth are more likely to be viewing or listening. PSAs can enhance any media campaign but by themselves are unlikely to have an impact on youth if they air at times when few youth are tuning in. (*The Role of Information Dissemination and Mass Media in Youth-oriented Prevention,* working title, under development at NCAP.)

- Media campaigns should allow for the different viewing habits of younger and older adolescents, utilizing radio and television appropriately. Effective use of the mass

media must also recognize that interests of youth vary depending on age and gender, so that the images and sounds should appeal to the target audience. (*The Role of Information Dissemination and Mass Media in Youth-oriented Prevention,* working title, under development at NCAP.)

- Youth-oriented mass media campaigns are more effective if they avoid the use of authority figures and exhortations. Focus group research indicates that overbearing messages are likely to lose the target audience. (*The Role of Information Dissemination and Mass Media in Youth-oriented Prevention,* working title, under development at NCAP.)

Prevention Education

- Traditional education about harms and risks associated with substance use and abuse cannot, by itself, produce measurable and long-lasting changes in substance abuse-related behavior and attitudes (Goodstadt,1974; Hansen, 1992). Educational approaches that combine the conveyance of information about the harms of substance abuse with the fostering of skills (problemsolving, communication) and promoting protective factors have been shown to be more effective (Botvin et al., 1994, 1995; Eggert et al., 1994, 1995; Tobler, 1986, 1992). (Recommendations and citations derived from Kumpfer [1997], *The Role of Education Substance Abuse Prevention* [working title, under development at NCAP], and *Meta-Analysis of the Effectiveness of School-Based Programs* [working title, under development at NCAP].)

- Didactic approaches are among the least effective educational strategies (Clayton et al., 1991, 1996; Tobler, 1986). Research suggests that interactive approaches engaging the target audience are more effective (Botvin et al., 1994; Connell et al., 1985; Johnson et al., 1990; Perry et al., 1996; Shope et al., 1994; Walter et al., 1989). These approaches include cooperative learning, role plays, and group exercises. (Recommendations and citations derived from Kumpfer [1997], *The Role of Education in Substance Abuse Prevention* [working title, under development at NCAP], and *Meta-Analysis of the Effectiveness of School-Based Programs* [working title, under development at NCAP].)

- Educational interventions for youth that are peer led or include peer-led components are more effective (Errecart et al., 1991; Tobler, 1986, 1992). Peer-led programs tend to require extensive prior instruction for peer educators, however. (Recommendations and citations derived from Kumpfer [1997], *The Role of Education Substance Abuse Prevention* [working title, under development at NCAP], and *Meta-Analysis of the*

Effectiveness of School-Based Programs [working title, under development at NCAP].)

- Intensively implemented educational programs with youth appear to be more effective (Botvin et al., 1992, 1994; Connell et al., 1985; Johnson et al., 1990; Pentz et al., 1989; Tobler, 1986; Walter et al., 1989). These types of programs usually last an academic year or longer and may involve booster sessions one to several years after the original intervention. (Recommendations and citations derived from Kumpfer [1997], *The Role of Education Substance Abuse Prevention* [working title, under development at NCAP], and *Meta-Analysis of the Effectiveness of School-Based Programs* [working title, under development at NCAP].)

- Social skills training programs target many risk factors across many domains (e.g., individual, family, peer, school) and are related to reductions in the onset and continuation of substance use and improvements in communication and goal-setting (synthesis from matrix).

- Programs that involve booster sessions help youth maintain skills over longer periods of time. Comprehensive programs designed to last over longer periods of time can result in broader and longer gains (Botvin et al., 1995; SMART Leaders, CSAP Grant #903).

- Programs that involve interactive teaching where students can actually practice newly acquired skills (e.g., role play) are beneficial (Across Ages, CSAP Grant #2779; Botvin et al., 1995; Creating Lasting Connections, CSAP Grant #1279; Residential Student Assistance Program, CSAP Grant #618).

- These programs can take place in any environment, so this type of programming is transferrable. For instance, social skills can be taught via in-school curricula, individual therapy, after-school mentoring, etc. (synthesis from matrix).

- Research shows that educational approaches targeting the family (parents and children) and school-based approaches involving parents or complementing student-focused curricula with parent-focused curricula can be effective in preventing adolescent substance use (Kumpfer, 1996; Pentz et al., 1989; Pentz, 1995; Walter et al., 1989). (Recommendations and citations derived from Kumpfer [1997], *The Role of Education Substance Abuse Prevention* [working title, under development at NCAP] and *Meta-Analysis of the Effectiveness of School-Based Programs* [working title, under development at NCAP].)

-Parent and family skills training has had positive effects on measures related to knowledge, parenting skills, communication skills, problem-solving skills, child-management skills, parenting satisfaction, and coping skills. Also, these programs have been shown to decrease parental stress, family conflict, and substance abuse, and improve parent-child bonding and cohesion, and attitudes toward and acceptance of children. For children and youth, positive outcomes have included increases in pro-social behavior and decreases in hyperactivity, social withdrawal, aggression, and delinquency (CSAP Family PEPS; DARE To Be You, CSAP Grant #1397; Spoth, in press).

-Programs with two sets of workshops that work to improve parent skills along with adolescent skills have positive outcomes for both parents and youth (Creating Lasting Connections, CSAP Grant #1279; DARE To Be You, CSAP Grant #1397).

-Programs that involve sessions where parents and youth learn and practice skills both separately and together are also beneficial (Creating Lasting Connections, CSAP Grant #1279; DARE To Be You, CSAP Grant #1397).

-Videotaped training and education can be effective and cost-efficient (CSAP Family PEPS).

-Providing meals, child care (for nontarget children), and transportation encourages family participation (DARE To Be You, CSAP Grant #1397).

Alternatives

- Alternatives should be part of a comprehensive prevention plan that includes other strategies with proven effectiveness (Parker, 1990; Schaps et al.,1981). Environmental strategies that reduce the availability of alcohol, tobacco, and drugs appear to be among the more effective strategies (Recommendations and citations derived from *CSAP Technical Report 13: A Review of Alternatives Activities and Alternatives Programs in Youth-Oriented Prevention*, 1996).

- The appropriateness and effectiveness of alternatives depends in part on the target group. The research of Tobler (1986) indicates that alternatives are more likely to be effective with high-risk youth who may not have adequate adult supervision or access to a variety of activities and who have few opportunities to develop the kinds of personal skills needed to avoid behavioral problems (Recommendations and citations derived from *CSAP Technical Report 13: A Review of Alternatives Activities and Alternatives Programs in Youth-Oriented Prevention*, 1996).

- The effectiveness of alternatives approaches depends on the nature of the alternatives offered. If the alternative activity offered is not attractive or appropriate to the target group, it will not garner participation. Recently, preventionists have involved youth in the development of alternatives programs (Armstrong, 1992). (Recommendations and citations derived from *CSAP Technical Report 13: A Review of Alternatives Activities and Alternatives Programs in Youth-Oriented Prevention*, 1996).

  -Community service has been related to increased sense of well-being and more positive attitudes toward people, the future, and the community and allows youth to "give back" to their community (Across Ages, CSAP Grant #2779; Fo & O'Donnell, 1974, 1975; Tierney et al., 1995).

  -Mentoring programs provide youth with structured time with adults and are related to reductions in substance use and increases in positivity toward others, the future, and school. Also, participation in these programs is related to increased school attendance (Across Ages, CSAP Grant #2779; Tierney et al., 1995).

  -The more highly involved the mentor, the greater the positive results (Across Ages, CSAP Grant #2779).

  -These programs have broader effects than just on the youth because they involve other community members (such as, elder community members) (Across Ages, CSAP Grant #2779).

  -Provision of organized recreation/cultural activities by community agencies can decrease substance use and delinquency by providing both drug-free alternatives and monitoring and supervision of children.

- More intensive programs that include a variety of approaches seem to be most effective. Not surprisingly, meta-analyses, as well as individual evaluations, find that programs that provide intensive interventions, including many hours of involvement in the program and related services, are most effective (Everyday Theater Youth Ensemble, 1993; Howard, 1993; Schaps et al., 1981; Tobler, 1986) (Recommendations and citations derived from *CSAP Technical Report 13: A Review of Alternatives Activities and Alternatives Programs in Youth-Oriented Prevention*, 1996).

- Alternatives provide a natural and effective way of providing prevention services to high- risk youth. Youth who may already be disengaged from schools (and therefore do

not respond to school-based prevention programs) may make use of alternatives programs, such as drop-in centers. Enjoyable activities may provide an incentive for involvement and provide an opportunity for more structured intervention in alcohol and drug use or other high-risk behavior (Recommendations and citations derived from *CSAP Technical Report 13: A Review of Alternatives Activities and Alternatives Programs in Youth-Oriented Prevention*, 1996).

- Alternatives can be part of a comprehensive prevention effort in a community, establishing strong community norms against misuse of alcohol and use of illicit drugs. Although a one-shot community event may not change the behavior of participants, such an event can serve as strong community statement that supports and celebrates a no-use norm. Such events also draw public and media attention to alcohol and drug issues and therefore increase awareness and support for other important prevention efforts. For these alternative activities to be truly effective, however, they must be viewed not as ends in themselves, but rather as components of an integrated, comprehensive prevention strategy (Recommendations and citations derived from *CSAP Technical Report 13: A Review of Alternatives Activities and Alternatives Programs in Youth-Oriented Prevention*, 1996).

Problem Identification and Referral

- Before implementing this type of strategy, planners should obtain accurate estimates of the numbers of youth whose substance abuse patterns justify intervention services. These estimates must begin with an acknowledgment of the multidimensional nature of youth substance abuse patterns: patterns that include experimental use that does not progress to abuse or problem behavior. Ultimately, these estimates are needed to answer basic questions concerning the relative emphasis that should be placed on problem identification versus other prevention approaches (*The Role of Problem Identification and Referral in Youth-Oriented Prevention*, working title, under development at NCAP).

- Incorporating problem identification and referral into prevention programs ensures that youth who may already be using drugs at the time of the prevention effort will receive appropriate treatment to meet their needs (Creating Lasting Connections, CSAP Grant #1279; Residential Student Assistance Services, CSAP Grant #618).

  -Providing transportation to appropriate treatment programs encourages youth to participate (e.g., Alcoholics Anonymous) (Residential Student Assistance Services, CSAP Grant #618).

- Problem identification and referral programs should not ignore the relationship between substance use and a variety of other adolescent health problems such as mental health problems, family problems, early and unwanted pregnancy, sexually transmitted diseases, school failure, and delinquency. This clustering of problems greatly shapes the identification of desired program effects (*The Role of Problem Identification and Referral in Youth-Oriented Prevention*, working title, under development at NCAP).

- Program planners should be aware that early-identification programs can pose risks to the youth involved. Early-identification programs target specific individuals for participation and are more intensive in nature than prevention efforts directed to the general adolescent population. The labeling associated with this prevention strategy may increase the probability of future deviance. Another risk may result from exposing youth who engage in experimental substance use to youth with more problematic substance abuse and other deviant behaviors (*The Role of Problem Identification and Referral in Youth-Oriented Prevention,* working title, under development at NCAP).

- Rigorous research on the effectiveness of this prevention strategy limits the degree to which additional implementation guidance can be offered. Research on brief interventions with the general population in health care settings (e.g., tobacco cessation and reducing problem drinking programs delivered in dental and primary care practices) has produced positive results in randomized controlled studies. The application of brief interventions to children and adolescents appears promising (*The Role of Problem Identification and Referral in Youth-Oriented Prevention*, working title, under development at NCAP). In addition:

  -Family therapy has been shown to be an effective resource for improving family functioning, increasing parenting skills, and decreasing recidivism of juvenile offenders (CSAP Family PEPS; Kumpfer et al., 1996; Kumpfer & DeMarsh).

  -Family therapy can serve as one part of a multicomponent prevention effort (CSAP Family PEPS; Kumpfer et al., 1996; Kumpfer & DeMarsh).

  -It is not clear if family clinical therapy is as effective with young children as with adolescents. Younger children have less severe behavior problems than adolescents, and much of the research on family therapy has focused on juvenile offenders (CSAP Family PEPS).

Community-Based Processes

- Community partnerships can be effective in eliciting change both at the systems level and at the individual behavior level (CSAP Community Partnerships, unpublished document).

  -Characteristics of successful partnerships include: A vision of the partnership's objectives; Committed partnership members; Participation of groups from all parts of the community; and Extensive prevention activities that reach a large number of individuals.

- Multiagency activities can increase coordination of efforts between public and private agencies, and between law enforcement and service providers (CSAP Community Partnerships, unpublished document).

  -Groups can work together to secure funding for substance use prevention programming efforts.

  -Interagency coordination can increase access to and quality of prevention and treatment services.

  -Active/mobilized communities have shown decreases in alcohol, tobacco, and other drug use and changes in perceived norms about substance use. In addition, these communities have improved perceptions of neighborhood quality by environmental changes such as, closing crack houses and removing billboards for alcohol and tobacco.

  -Provision of constructive activities for youth can reduce/prevent substance use and delinquency, and increase cultural pride and coping skills.

- Community-based coalitions should begin with a clear understanding of their purpose. Prevention-oriented coalitions can aim to improve the nature and delivery of services to a community (comprehensive service coordination), generate community activism to address substance-related problems (community mobilization), or both (community linkage). Clarity of purpose will facilitate coalition development and, ultimately, coalition success (Phillips & Springer, 1997).

- Coalition membership must be appropriate to the shared purpose and plan for action. If comprehensive service coordination is the task, organization leaders need to be involved, especially if an organization is expected to be a key contributor to a particular intervention. If community mobilization is the task, grassroots activists and community citizens must be involved. Community linkage coalition models require a mix of both types of community members. This results in diverse expectations and operating

assumptions for the coalition that must be resolved to avoid conflict and role confusion (Phillips & Springer, 1997).

- Active membership participation depends on meeting the needs of members. Community leaders and professionals seek accomplishments related to their organizational interests and receive rewards through the organizational aspects of the coalition and through the distribution of resources. Citizen activists and members seek a useful application of their time and receive rewards from participation in program activities and not in activities related to organizational maintenance (Phillips & Springer, 1997).

- Appropriate organization can facilitate collective action. Coalition-based community interventions tend to devote a lot of energy, at least initially, on developing organizational structure and procedures (committees, task forces, roles, responsibilities). Experience indicates that elaborate committee structures are not productive and sometimes are counterproductive. Committees or task forces with specific purposes or responsibility for specified programmatic activity sustain higher membership (Phillips & Springer, 1997).

- Leadership is essential and can take different forms. Effective leadership may reside with a dynamic or visionary individual. But one problem associated with this type of leadership is that it is not transferable. Well-functioning coalitions often create opportunities for satisfying and effective participation of members resulting in a "leadership of ideas" demonstrated in a well-articulated plan of action (Phillips & Springer, 1997).

- Planning is critical and should be adapted to the coalition's purpose, organization, and membership. A coalition must begin with a clear understanding of the substance-related problems it seeks to change. Information about these problems should be validated through available empirical evidence. Coalition-generated needs assessments are often difficult to conduct or, due to an absence of resources and/or skills, poorly implemented. Once outcome-based objectives are set, specific action plans can be developed (Phillips & Springer, 1997).

- Voluntary coalitions should implement proven, effective strategies. Community-based approaches are based in part on appreciation for local involvement and authority in choosing and carrying out collective action. This philosophy is embodied by the concept "empowerment," and although this "paradigm shift" in prevention is important, it should not result in barriers to effective coalition action. Research has identified the

more effective prevention approaches, and this knowledge must be utilized (Phillips & Springer, 1997).

- Facilitating community-based collective action requires appropriate roles for paid staff. Paid coalition staff operate more effectively as resource providers and facilitators than as direct community organizers. Paid staff can fill essential clerical, coordination, and communications functions that help to hold diverse coalitions together. Paid staff also can provide leadership through expertise in strategies and programmatic activities that will further the coalition goals (Phillips & Springer, 1997).

- Coalition-based community processes must approach their strategies and programmatic actions from an outcome-based perspective and must be ready to make adjustments to the plan of action in order to meet these outcome-based goals. The effectiveness of community-based processes is not a reflection of a coalition's organizational structure or design. It is a function of strategies and activity. If the intervention appears to be ineffective, changes and adjustments in the coalition's action plan, not its organizational structure, are required (Phillips & Springer, 1997).

- Clear purpose, appropriate planning, and commitment to results produce effective collective action. Community-based processes will break the traditional bonds of organizational inertia and pathology only if the primacy of purpose is recognized and an action strategy is shaped by research-based findings on effective interventions (Phillips & Springer, 1997).

Environmental Approaches

Recommendations for the application of this prevention strategy are derived from Stewart (1997) and *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* (under development at NCAP).

Price Interventions

- Increasing the price of alcohol and tobacco through excise taxes is an effective strategy for reducing consumption, both prevalence of use and amount consumed by users (Chaloupka & Grossman, 1996; Edwards et al., 1994; Evans & Farrelly, 1997; National Cancer Institute, 1993; U.S. Department of Health and Human Services, 1989, 1992, in press). It also can reduce various alcohol-related problems, including motor vehicle fatalities (Saffer & Grossman, 1987), driving while intoxicated, rapes, robberies (Cook, 1981; Cook & Moore, 1993; Cook & Tauchen, 1984), cirrhosis mortality (Cook &

Tauchen, 1982), and suicide and cancer death rates (Sloan, Reilly & Schenzler, 1994). However, efforts to drive up the price of illicit drugs through law enforcement efforts (source-country crop destruction, interdiction, and disruption of distribution networks) have been relatively ineffective in reducing drug sales. (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

Minimum Purchase Age Interventions

- Increasing the minimum purchase age for alcohol to 21 has been effective in decreasing alcohol use among youth (O'Malley & Wagenaar, 1991; Wagenaar, 1993), particularly beer consumption (Berger & Snortum, 1985) and in reducing alcohol-related traffic crashes (Johnson, 1995; Toomey, Rosenfeld, & Wagenaar, 1996; U.S. General Accounting Office, 1987; Wagenaar, 1993). It is associated with reductions in other alcohol-related problems, including deaths resulting from suicide, pedestrian injuries, and other unintentional injuries (Jones, Pieper, & Robertson, 1992); youth homicide (Parker & Rebhun, 1995); and vandalism (New York State Division of Alcoholism and Alcohol Abuse, 1984). Outcomes related to minimum purchase age laws for tobacco are not known because such laws have only recently begun to be enforced. (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

- Enforcement of minimum purchase age laws against selling alcohol and tobacco to minors using undercover buying operations (also known as "decoy" or "sting" operations) can substantially increase the proportion of retailers who comply with such laws (Cummings & Coogan, 1992; Feighery, Altman, & Shaffer, 1991; Forster, Murray, Blaine, Wagenaar, & Hennrikus, 1997; Jason, Ji, Anes, & Birkhead, 1991). Undercover buying operations conducted by community groups that provide positive and negative feedback to merchants are also effective in increasing retailer compliance (Biglan et al., 1995; Lewis et al., 1996). (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

- More frequent enforcement operations lead to greater reductions in retailer noncompliance (Jason, Billows, Schnopp-Wyatt, & King, 1996; Preusser, Williams, & Weinstein, 1994). (Citations as seen in Stewart [1997], *Environmental Strategies for*

Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems [under development at NCAP].)

- "Use and lose" laws, which allow suspension of the driver's license of a person under 21 years of age following a conviction for any alcohol or drug violation (e.g., use, possession, or attempt to purchase with or without false identification), are an effective means for increasing compliance with minimum purchase age laws among youth (Preusser, Ulmer, & Preusser, 1992). Penalties should be swift, certain, and meaningful (Ross, 1992). Penalties should not be too harsh, however, because severity is not related to effectiveness and, if they are too severe, law enforcement and judicial officers may refuse to apply them. (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

- Community awareness and media efforts can be effective tools for increasing awareness of the likelihood of apprehension and punishment and reducing retailer noncompliance (Keay, Woodruff, Wildey, & Kenney, 1993). They also offer a means for changing social norms to be less tolerant of sales to and use by minors and for decreasing the cost of law enforcement operations. (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

Deterrence Interventions

- Deterrence laws and policies for impaired driving have been effective in reducing the number of alcohol-related traffic crashes and fatalities among the general population and particularly among youth. Reducing the legal BAC limit to .08 or lower in criminal per se laws has been shown to reduce the level of impaired driving (Kloeden & McLean, 1994) and alcohol-related crashes (Johnson, 1995). (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

- Enforcement of impaired driving laws is important to deterrence because it increases public perception of the risk of being caught and punished for driving under the influence of alcohol. Law enforcement efforts to detect and arrest drinking drivers include sobriety checkpoints, which do not result in high levels of detection of drinking drivers (Jones & Lund, 1985), and passive breath sensors that allow police officers to

test a driver's breath without probable cause and substantially increase the effectiveness of sobriety checkpoints (Ferguson, Wells, & Lund, 1995; Voas, Rhodenizer, & Lynn, 1985). (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

- In terms of penalties for impaired driving, administrative license revocation, which allows confiscation of the driver's license by the arresting officer the driver is arrested with an illegal BAC or if the driver refuses to be tested, has been shown to reduce the number of fatal traffic crashes (Hingson, 1993; Ross & Gilliland, 1991; Zador, Lund, Fields, & Weinberg, 1989) and recidivism among DUI offenders (Stewart, Gruenewald, & Roth, 1989). Actions against vehicles and tags have been mostly applied to multiple DUI offenders, with some preliminary evidence that they can lead to significant decreases in recidivism and overall impaired driving (Voas & Tippetts, 1994). (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

- Impaired driving policies targeting underage drivers–particularly zero tolerance laws setting BAC limits at .00 to .02 percent for youth and graduated driving privileges, in which a variety of driving restrictions are gradually lifted as the driver gains experience and maturity–have been shown to significantly reduce traffic deaths among young people (Blomberg, 1993; Hingson, 1992; Hingson, Heeren, & Winter, 1994; Sweedler, 1990). (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

Interventions addressing location and density of retail outlets

- Limitations on the location and density of retail outlets may help contribute to reductions in alcohol consumption (Gruenewald, Ponicki, & Holder, 1993), traffic crashes (Gruenewald & Ponicki, 1995b; Scribner, MacKinnon & Dwyer, 1994), and certain other alcohol-related problems, including cirrhosis mortality (Gruenewald & Ponicki, 1995a), suicide (Gruenewald, Ponicki, & Mitchell, 1995), and assaultive offenses (Scribner, MacKinnon, & Dwyer, 1995). With respect to illicit drugs, neighborhood antidrug strategies such as citizen surveillance and the use of civil remedies, particularly nuisance abatement programs, can be effective in dislocating dealers and reducing the number and density of retail drug markets and possibly other crimes and signs of physical disorder within small geographical areas (Davis, Smith, Lurigio, &

Skogan, 1991; Eck & Wartell, in press; Green-Mazerolle, Roehl, & Kadleck, in press; Lurigio et al., 1993; Rosenbaum & Lavrakas, 1993; Smith, Davis, Hillenbrand, & Goretsky, 1992). (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

Restrictions on use

- Restrictions on use in public places and private workplaces (also known as "clean indoor air" laws) have been shown to be effective in curtailing cigarette sales (Chaloupka & Saffer, 1992) and tobacco use because both lower smoking prevalence and lower average daily cigarette consumption (Chaloupka, 1992; Chaloupka & Grossman, 1996; Chaloupka, Pakula, Grossman, & Gardiner, 1997; Evans, Farrelly, & Montgomery, 1996; Ohsfeldt, Boyle, & Capilouto, in press; Wasserman, Manning, Newhouse, & Winkler, 1991) among adults and youth. Additional benefits of clean indoor air laws are that they reduce nonsmokers' exposure to cigarette smoke and they help to alter norms regarding the social acceptability of smoking (U.S. Department of Health and Human Services, 1994). The effects of restrictions on alcohol use have not been systematically evaluated. (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

Server-oriented interventions

- With respect to alcohol, server training programs have been found to affect beliefs and knowledge (Gliksman et al., 1993; Howard-Pitney, Johnson, Altman, Hopkins, & Hammond, 1991), with mixed findings of impacts on server practices (Gliksman et al., 1993; McKnight, 1993) and traffic safety measures (Holder & Wagenaar, 1994; Saltz, 1989). Retailer education for tobacco merchants has led to relatively small, short-term reductions in sales to minors (Altman, Rasenick-Douss, Foster, & Tye, 1991; DiFranza & Brown, 1992; DiFranza, Savageau, & Aisquith, 1996; Skretny, Cummings, Sciandra, & Marshall, 1990). (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

- When server training is combined with enforcement of laws (against service to intoxicated patrons, against sales to minors), training programs are much more effective in producing changes in selling/serving practices (Cummings & Coogan,

1992; Feighery, Altman, & Shaffer, 1991; McKnight & Streff, 1994). (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

- Education and training programs are important to teach servers about laws, the penalties for violation, how to recognize signs of intoxication and false identification, and how to refuse sales, but they generally are not sufficient when used alone to produce substantial and sustained shifts in compliance with laws (Altman, Rasenick-Douss, Foster, & Tye, 1991; DiFranza & Brown, 1992; DiFranza, Savageau, & Aisquith, 1996; Skretny, Cummings, Sciandra, & Marshall, 1990). (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

Counteradvertising

- Counteradvertising campaigns that disseminate information about the hazards of a product or the industry that promotes it may help reduce cigarette sales (Lewit, Coate, & Grossman, 1981; Schneider, Klein, & Murphy, 1981) and tobacco consumption (Chaloupka & Grossman, 1996). The limited research on alcohol warning labels suggests they may affect awareness, attitudes, and intentions regarding drinking but do not appear to have a major influence on behavior (Gordis, 1996; Hilton, 1993). Studies have suggested that more conspicuous labels would have a greater effect on awareness and behavior (Barlow & Wogalter, 1993; Laughery, Young, Vaubel, & Brelsford, 1993; Malouff, Schutte, Wiener, Brancazio, & Fish, 1993). (Citations as seen in Stewart [1997], *Environmental Strategies for Substance Abuse Prevention: Analysis of the Effectiveness of Policies to Reduce Alcohol, Tobacco, and Illicit Drug Problems* [under development at NCAP].)

CSAP HRY Model Programs

The following substance abuse prevention programs were identified as model programs through the work of the HRP DataBank.

- Across Ages–CSAP Grant #2779
- The Child Development Project–CSAP Grant #2647

- Creating Lasting Connections–CSAP Grant #1279
- DARE to Be You–CSAP Grant #1397
- Greater Alliance of Prevention Systems–CSAP Grant # 1013
- Involving Parents of HRY in Prevention–CSAP #1383
- Residential Student Assistance Program–CSAP Grant #618
- Smart Leaders/Booster Sessions– CSAP Grant #903

Chapter 4
Guidance in Implementing and Adopting Models and Principles

The primary purpose in developing conclusions about effectiveness of prevention principles or in identifying effective program models is to provide guidance to those who must ask relevant questions about program funding and design. The purpose of a guidance is not to force specific models upon states or other program implementors, but rather to inform them of models and principles that might assist them in program design and implementation. Below, we offer three bulleted sets of guidance to assist program planners, policy makers and researchers to (1) use the information in the Data Matrix (Chapter 2) to identify program models and principles directly from the research cited; (2) identify other science-based sources of program models and/or principles; and (3) evaluate program proposals.

Using the Information in the Data Matrix

The Data Matrix in Chapter 2 was used, in part, to identify the prevention principles detailed in Chapter 3. In addition, expert consensus reviews of studies listed in this matrix revealed a number of science-based model programs. These model programs can be adopted directly as "science-based" (identified in the matrix by *). Similarly, the principles cited have been identified as scientifically based. However, identification of science-based model programs is still limited to work done within CSAP's HRY Populations Demonstration Program, and derivation of science-based principles is not comprehensive.

The matrix itself presents a number of studies that, when reviewed further, also might suggest science-based program models and prevention intervention principles. The following guidance is meant to assist the reader in using the information in the Data Matrix for independent assessment.

- Identify the outcome domain in which you are interested or that you wish your program to target.
- Find the outcome domain in the matrix and then identify the subdomain/measures in which you are interested.
- Scroll across the matrix to identify the relevant prevention strategies/activities.
- Scroll across the matrix to identify the program(s) that have used the identified strategy/activity to positive effect. Full program and/or research citations can be found in the References section.

- In addition to a brief citation of the program, the final column of the matrix also provides codes for relevant CSAP strategies and notes IOM strategy types.

Independent Identification of Science-Based Programs and Principles

Based on the operational definition of "science-based" programs/principles presented earlier, programs or research endeavors that have undergone an expert/peer consensus review process (Types 3 through 5) qualify as providing acceptable information about program principles and/or strategies. However, readers are cautioned to review for themselves the consistency of data reported; a truly effective program will demonstrate a preponderance of similarly positive findings and show no evidence of drug substitution.

In reviewing original documents, readers should apply some variant of the nine criteria used by CSAP in its review of the HRP Demonstration Grants. Specific attention should be paid to the following points:

- The intervention has a clear theoretical or conceptual basis.
- The intervention matches the needs of the population.
- The intervention matches the desired outcomes.
- The intervention is well-implemented, and dosage is sufficient to effect change.
- Measures clearly reflect desired outcomes, are reliable and valid, and are collected in a way to minimize social desirability and response demand.
- Analyses are thorough and appropriate. Results of analyses of all key dependent measures are reported and consistent.
- No other threats to the validity of the study exist (e.g., high and/or differential attrition, contamination of comparison group(s); self-selection; initial, uncorrected noncomparability of treatment and comparison samples).

The above constructs can be scored on any Likert-type scale ranging from low to high quality. (See Figure 3 for sample ratings.) A more detailed explication of the rating process can be obtained from CSAP in its monograph entitled *Understanding Substance Abuse Prevention–Towards the Twenty-First Century: A Primer on Effective Programs* (Brounstein & Zweig, in press).

Reviewing Program Proposals

Central to the decision concerning implementing an effective program is determining the fit between the targeted population’s needs and the planned intervention as well as

identifying those programs/practices that are scientifically defensible. Several steps are required in this process:

- Determine the specific needs of the “community,” by developing the following:

  -A definition and description of the community to be served by the project (e.g., a defined geographic area such as a neighborhood, or a municipality, or a "community of interest" such as "Latino community").

  -A needs assessment for the defined community that includes, at a minimum, substance use prevalence data and identification of major risk and protective factors in the community. The needs assessment may rest upon archival data, new data collected by the applicant, or both. The subrecipient must identify the instruments to be used for measuring baseline and change in substance use prevalence.

  -A "resource inventory" that describes, for the defined community, existing strengths and assets (including organizations and their programs) that address the need or have the potential to do so. When collaboration or a coalition is involved, the subrecipient provides written evidence of "partner agreements."

- Select interventions theoretically or demonstrably related to the behaviors and outcome measures targeted for change, ensuring that the interventions are developmentally and culturally appropriate. Include the following components:

  -A description of the logical connections between the needs/resource assessment and the proposed prevention interventions.

  -A description of the changes expected to occur within the target population/defined community resulting from the project and how the intended intervention components/activities are thought to bring about these changes (i.e., a "program theory" for the project).

  -Documentation that the project is using "science-based interventions", evidenced by employing general prevention principles or specific programs identified by the review processes specified earlier.

  -Project demonstrates "comprehensive prevention programming", using multiple prevention strategies, delivered through multiple domains, targeted at substance use and related problem behaviors.

- Create an action plan, including the following components:

  -A description of the project goal or a general and concise statement of what is to be accomplished.

  -Project objectives expressed in measurable terms and anchored to a specific timeframe (e.g., what specific changes are expected to occur resulting from the project prevention interventions).

  -Description of the prevention strategies to be employed to bring about objectives, with specification of target population(s), setting(s), and detailed activities in terms of duration and intensity.

  -Description of the process and outcome evaluation plan to be included for the recipient level. (Note: All subrecipients are expected to gather process as well as substance use outcome data on the community level. The remaining question is whether program specific outcome data will be gathered.)

  -Description of how the project ensures cultural inclusion in its process and products.

  -Sound local evaluation plan including measures of targeted change over time in relation to change observed in comparable others.

  -Timeline specifying target dates for prevention implementation benchmarks and assigning organizational and/or staff responsibility for each benchmark.

  -Staffing plan describing project staff, qualifications, responsibilities, and time devoted to project and its evaluation.

- Demonstrate organizational capacity of the recipient by providing the following:

  -Evidence that the recipient's organizational vision, mission, or purpose aligns well with the intent of the Request For Contracts (RFC).

  -Evidence that the recipient is well established and has a recent history of accomplishments in similar realms.

  -Evidence of organizational structure, resources, and management procedures sufficient to implement the proposed project and provide project accountability.

-Capacity to monitor ongoing implementation activities of the project and capability to analyze and report on these data.

-If a coalition, evidence of a broad base of organizations from multiple community sectors.

In Appendix A and Appendix B, the above has been reformatted into review tools to identify science-based program proposals. Appendix A is a program proposal guide for subrecipient agencies outlining the issues that must be addressed to demonstrate scientifically-based activities. Appendix B is a program review tool that can be used by the funding entity to rate program proposals.

Glossary

Approach:	A set of prevention strategies that typify a program and can be employed in an intervention setting without adopting the program *in toto.*
Credibility of findings:	Derives from the quality of intervention implementation plus the methodological rigor of the research. When both are high, findings are attributable to the intervention and therefore have high credibility.
Effective:	Preponderance of research or program findings is consistent, positive, and clearly related to the intervention.
Evaluation Research:	A set of procedures to determine the effectiveness of an intervention program.
Fidelity:	Concordance of a replicated program model or strategy with the specifications of the original.
Framework:	A general structure supporting the development of theory.
Generalizability:	The extent to which program findings/principles/models apply to other populations and/or settings.
Impact:	The net effect observed within an outcome domain.
Integrity:	The level of credibility of study findings based on peer consensus ratings of quality of implementation and of evaluation methods.
Outcome:	Changes observed on targeted measures.
Prevention Principle:	A principle is prescriptive and can provide implementation directions and define effective practices. A principle can be derived from science-based program evaluations, either across multiple program implementations of the same type or of programs of different types through meta-analyses.

Program:	The sum of all program modules implemented by an administrating agent.
Program Activity;	A specified set of behaviors that constitute a portion of an intervention strategy (e.g., lecture, field trip)
Program Model:	A program taken as a whole. All of the program activities/interventions and administrative structure comprise the model.
Program Module/ Program Component:	An intervention activity affecting a target population. The module/component is one of several parts that are grouped together to form a complete program.
Reliability:	The extent to which a measure produces the same result time after time, across venues and/or raters.
Science-based:	Substantiated through an expert consensus process. Conceptual and exact replications add to the credibility of findings/principles/models as being effective. (See operational definition in text for further elaboration.)
Strategy:	An individual component of a program intervention (e.g., life skills training or mentoring). CSAP promulgates six specific strategies: information dissemination, prevention education, alternatives, problem identification and referral, community-based process, and environmental strategies.
Utility:	Usefulness. Any science-based finding or principle has utility if it can be used to guide program development or implementation.
Validity:	The extent to which a measure of a particular construct truly reflects that construct.

References for Programs Listed in Data Matrix

The reference list below catalogs the programs and research included in the Data Matrix. These references provide further information about and greater description of the programs/research in which the reader may be interested.

1. Center for Substance Abuse Prevention (unpublished document). ***Understanding Substance Abuse Prevention – Toward the 21st Century: A Primer on Effective Programs*****. Substance Abuse and Mental Health Services Administration, U.S. Department of Health and Human Services.**

- Across Ages (CSAP Grant #2779)
- The Child Development Project (CSAP Grant #4860)
- Creating Lasting Connections (CSAP Grant #1279)
- DARE To Be You (CSAP Grant #1397)
- Family Advocacy Network (CSAP Grant #1383)
- Greater Alliance of Prevention Systems (CSAP Grant #1013)
- Residential Student Assistance Program (CSAP Grant #618)
- SMART Leaders (CSAP Grant #903)

2. Center for Substance Abuse Prevention (unpublished document). ***The Nation's Communities at Work: How Community Partnerships Are Working to Prevent Drug Use in America*****. Substance Abuse and Mental Health Services Administration, U.S. Department of Health and Human Services.**

- CSAP Model Community Partnership 1
- CSAP Model Community Partnership 2
- CSAP Model Community Partnership 3
- CSAP Model Community Partnership 4
- CSAP Model Community Partnership 5

3. Gardner, S. E., Green, P. F., & Marcus, C. (1994). ***Signs of Effectiveness II – Preventing Alcohol, Tobacco, and Other Drug Use: A Risk Factor/Resiliency-based Approach.*** **Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, U.S. Department of Health and Human Services.**

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- An Early Intervention Program with Delinquent Substance Using Adolescents (CSAP Grant #326)

- Family Advocacy Network (CSAP Grant #1383)
- Families In Action (CSAP Grant #3080)
- Family MAASAI (CSAP Grant #3044)
- Friendly PEERsuasion (CSAP Grant #876)
- La Familia Fuerte (CSAP Grant #4860)
- The Logan Square Prevention Project (CSAP Grant #2884)
- Project Self-Discovery (CSAP Grant #4771)
- Project SUCCESS (CSAP Grant #1268)
- SMART Leaders (CSAP Grant #903)
- Southwest Texas State University's Program (CSAP Grant #1207)
- Substance Abuse Resources and Disability Issues (CSAP Grant #5074)
- Sunshine Project (CSAP Grant #6068)
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- NTU Project (CSAP Grant #1800)
- Project C.A.R.E. (CSAP Grant #1295)
- Southwest Texas State University's Program (CSAP Grant #1207)

6. Journal of Adolescent Research, Volume 11, No. 1, January 1996

- Across Ages (CSAP Grant #2779)
- The Child Development Project (CSAP Grant #4860)
- Creating Lasting Connections (CSAP Grant #1279)
- Project SUCCESS (CSAP Grant #1268)
- Multi-model School-based Prevention Demonstration (CSAP Grant #2630)

7. National Institute on Drug Abuse (1997). *Preventing Drug Use Among Children and Adolescents: A Research-Based Guide.* U.S. Department of Health and Human Services, National Institutes of Health.

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- Adolescent Transitions Program (Dishion et al., 1996, in press)
- Focus on Families (Catalano et al., in press)
- Life Skills Training Program (Botvin et al., 1990, 1995)
- Project Family, (Spoth, in press)
- Project STAR (Pentz, 1995; Pentz et al., 1989, 1991)
- Reconnecting Youth Program (Eggert et al., 1994, 1995)
- Seattle Social Development Project (Hawkins et al., 1992)
- Strengthening Families Program (Kumpfer et al., 1996; Kumpfer & DeMarsh)

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- African-American Adolescent Alcohol and Drug Program (CSAP Grant #537)
- CASPAR Intervention Project (CSAP Grant #1416)
- The Comprehensive Youth and Family Excellence Project (CSAP Grant #249)
- Families and Schools Together (CSAP Grant #3699)
- Growing Up Well (CSAP Grant #3073)
- Helping Children and their Families Face Drug Abuse (CSAP Grant #2851)
- Perth Amboy Community Partnership for Youth (CSAP Grant #1479)
- Project Involvement (CSAP Grant #909)
- Project Venture (CSAP Grant #2070)

- Reaching High Risk Youth in Public Housing (CSAP Grant #767)
- Storytelling for Empowerment (CSAP Grant #7821)
- Strategies with Technology and Affective and Remedial Support (CSAP Grant #1756)

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Appendix A
Program Proposal Guide

The sub-recipient (whether a specific community-based organization (CBO) or a CBO applying on behalf of a coalition) should provide the following in their RFC. Each of the components will be rated to judge the quality of the program proposal.

Needs Assessment

1) A definition and description of the "community" to be served by the project (e.g. a defined geographic area such as a neighborhood or a municipality or a "community of interest" such as "Latino community").

2) A needs assessment for the defined "community" which includes, at a minimum, substance use/abuse prevalence data and identification of major risk and protective factors in the community. The needs assessment may rest upon archival data, new data collected by the applicant or both. The sub-recipient must identify the instruments to be used for measuring baseline and change in substance use prevalence.

3) A "resource inventory" which describes, for the defined community, existing strengths and assets (including organizations and their programs) which address the need or may have the potential to do so. When collaboration or a coalition is involved, the sub-recipient provides written evidence of "partner agreements".

Conceptual Framework

(linking specified outcomes with science-based interventions intended to produce such outcomes)

1) A description of the logical connections between the needs / resource assessment and the proposed prevention interventions.

2) A description of the changes expected to occur within the target population / defined community resulting from the project and how the intended intervention components / activities are thought to bring about these changes (i.e. a "program theory" for the project).

3) Documentation that the project is using "science-based interventions", evidenced by employing general prevention principles or specific programs identified by CSAP (or identified by other agencies as outline in the accompanying paper).

4) Project demonstrates "comprehensive prevention programming", using multiple prevention strategies, delivered through multiple domains, targeted at substance use and related problem behaviors.

Action Plan Components

1) A description of the project goal or general and concise statement of what is to be accomplished.
2) Project objectives expressed in measurable terms and anchored to a specific time-frame (e.g. what specific changes are expected to occur resulting from the project prevention interventions).

3) Description of the prevention activities to be employed to bring about objectives, with specification of target population(s), setting(s) and detailed activities in terms of duration and intensity.

4) Description of the process and outcome evaluation plan to be included for the sub-recipient level. (note: all sub-recipients will be expected to gather process as well as substance use outcome level data on the community level - the remaining question is whether outcome data will be gathered on a sample of the program employed).

5) Description of how the project will insure cultural inclusion in its process and products.

6) Timeline that specifies target dates for prevention implementation benchmarks and assigns organizational and/or staff responsibility for each benchmark.

7) Staffing plan describes project staff, qualifications, responsibilities, time devoted to project.

Organizational Capacity of the Sub-recipient

1) Evidence that the sub-recipient's organizational vision, mission or purpose aligns well with the intent of the RFC .

2) Evidence that the sub-recipient is well established and has a recent history of demonstrated accomplishments in similar realms.

3) Evidence of organizational structure, resources and management procedures sufficient to implement the proposed project and provide project accountability.

4) Capacity to monitor the ongoing implementation activities of the project and capability to analyze and report on this data.

5) If a coalition, evidence of a broad base of organizations from multiple community sectors.

Justification for Science-based activities/programs

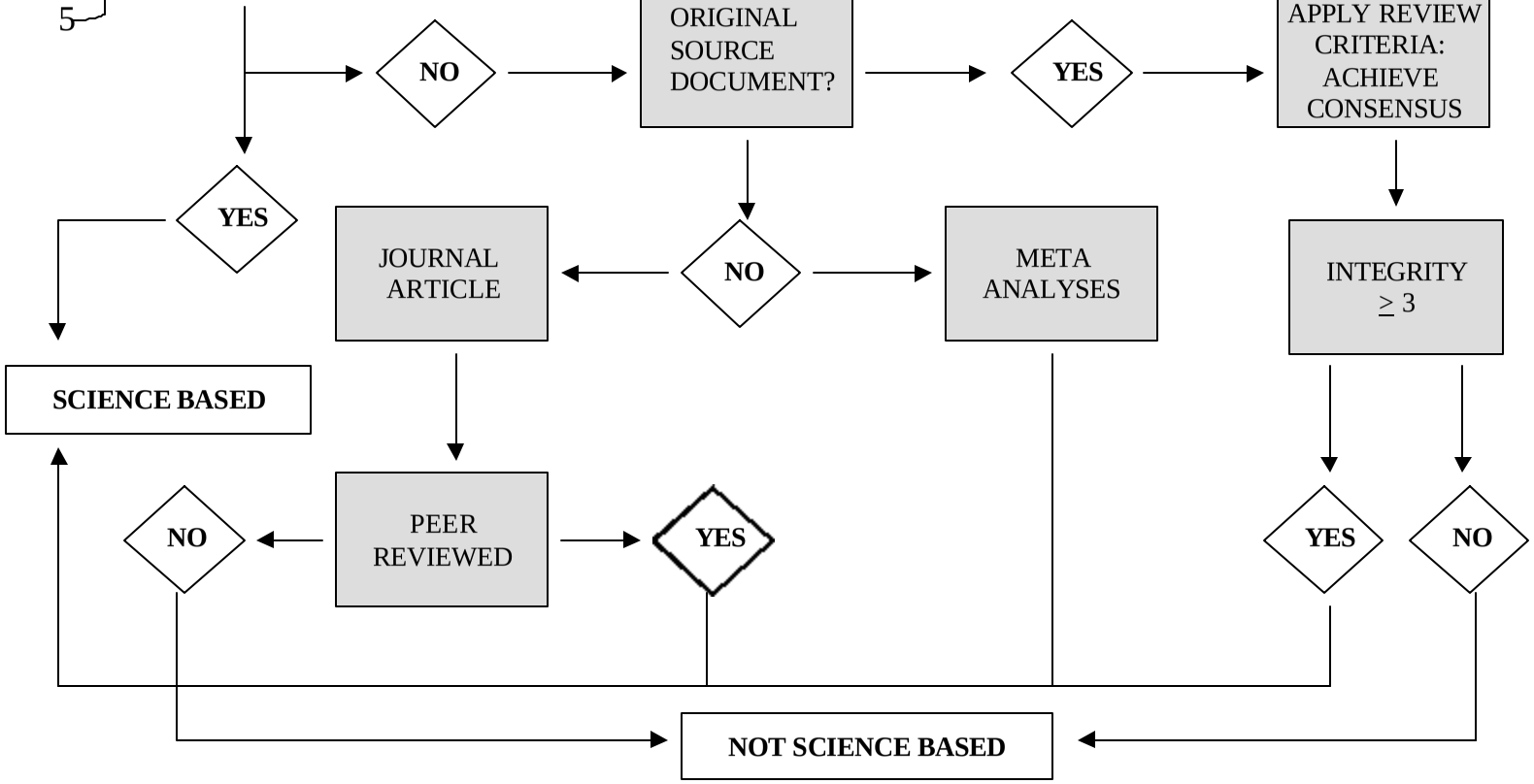
The following flow chart must be addressed in your proposal in order to demonstrate that science-based activities are being used. Please identify the steps of the flow chart mirror your decisions.

Justification for Science Based Activities/ Programs

Review Process Types

1
2 — Not Science Based

3
4
5 — In CSAP Document



Appendix B
Program Review Tool

To review the funding potential of a program proposal, please rate the following qualities:

Does the program address community needs:

1. Are data on community substance use prevalence presented?

   9 Yes **9** No

2. Specific risk factors being addressed:

   _____
   _____
   _____
   _____
   _____
   _____

   2a. Do the risk factors being targeted fit with the community's needs?

   9 Yes **9** No

3. Specific protective factors being addressed:

   _____
   _____
   _____
   _____
   _____
   _____

   3a. Do the protective factors being targeted fit with the community's needs?

   9 Yes **9** No

4. Does the proposal identify gaps in community services — needs vs. resources?

   9 Yes **9** No

5. Does the proposal identify community partners with whom the program can/will work?

9 Yes **9** No

Does the document propose science-based activities:

1. What domains are targeted by program activities:

9 Individual
9 Family
9 Peer
9 School
9 Community
9 Society/environmental

1a. Are multiple domains being targeted?

9 Yes **9** No

2. Are principles/models from the CSAP paper being used?

9 Yes **9** No (If No, go to Q. #3)

2a. Which models are being used?

_____
_____
_____

2b. Which principles are being used?

_____
_____
_____

2c. If multiple principles are being proposed, is there adequate justification for choosing these multiple principles (e.g., is clear justification as to how these principles will work together, etc.).

3. If Question 2 was no, then principles and models other than those identified by CSAP are being used. More information is required regarding how these activities were chosen.

   Based on the CSAP-defined types of review processes, what types of science-based processes are being used to identify these principles (**note that only Types 3-5 are considered science-based**)?

   9 Type 1 - not scientifically defensible
   9 Type 2 - not scientifically defensible
   9 Type 3 - expert/peer consensus process — scientifically defensible
   9 Type 4 - qualitative or quantitative meta-analysis— scientifically defensible
   9 Type 5 - replications of programs/principles— scientifically defensible

   3a. What are the principles/models being used?

   3b. If multiple principles are being proposed, is there adequate justification for choosing these multiple principles (e.g., is clear justification as to how these principles will work together, etc.).

3c. Should this be viewed as an innovation program?

   9 Yes **9** No

4. Which of the CSAP prevention strategies are being proposed?

   9 Information Dissemination

9 Prevention Education
9 Alternatives
9 Problem Identification and Referral
9 Community-based Process
9 Environmental Approach

4a. Are multiple CSAP strategies being proposed?

9 Yes **9** No

Program plan:

Please answer the following question on a 5-point scale ranging from 1-poor to 5-excellent.

1. The program's goals and objectives...

   1 2 3 4 5
   Poor Excellent

2. The program's strategies, target sample, and setting...

   1 2 3 4 5
   Poor Excellent

3. The program's timeline....

   1 2 3 4 5
   Poor Excellent

4. The program's budget...

   1 2 3 4 5
   Poor Excellent

5. The program's staffing plan...

   1 2 3 4 5
   Poor Excellent

Capacity:

Please answer the following question on a 5-point scale ranging from 1-poor to 5-excellent.

1. The program's vision and mission...

   1 2 3 4 5
   Poor Excellent

2. The organization demonstrated past accomplishments...

   1 2 3 4 5
   Poor Excellent

3. The organization's capacity...

   1 2 3 4 5
   Poor Excellent

4. The program is broad based and includes multiple community organizations...

   1 2 3 4 5
   Poor Excellent

5. Organization's capacity to collect data and conduct analysis....

   1 2 3 4 5
   Poor Excellent

Specified outcomes and links:

Please answer the following question on a 5-point scale ranging from 1-poor to 5-excellent.

1. Specification of the priority outcomes...

   1 2 3 4 5
   Poor Excellent

2. The links between the intervention strategies and outcomes are plausible...

   1 2 3 4 5
   Poor Excellent

The proposed dosage is plausible to effect outcome of interest...

1 2 3 4 5
Poor Excellent

Proposed evaluation plan:

Please answer the following question on a 5-point scale ranging from 1-poor to 5-excellent.

1. The timing of data collection periods is appropriate...

   1 2 3 4 5
   Poor Excellent

2. The quality of the measures...

   1 2 3 4 5
   Poor Excellent

3. The quality of the comparison group...

   1 2 3 4 5
   Poor Excellent

4. The quality of the planned analyses...

   1 2 3 4 5
   Poor Excellent

5. The quality of the retention/follow-up plan...

   1 2 3 4 5
   Poor Excellent